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United States
Department of
Agriculture

Forest
Service

FS-346

A Recommended Renewable Resources Program—1980 Update



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PROGRAM--1980 UPDATE

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Here is a list of abbreviations most commonly
used in this publication:

ACP: Agricultural Conservation Program
ASCS: Agricultural Stabilization and Conservation Service
BLM: Bureau of Land Management
CEQ: Council on Environmental Quality
CFA: Cooperative Forestry Assistance Act of 1978
CFR: Code of Federal Regulations
EPA: Environmental Protection Agency
FmHA: Farmers Home Administration
FIP: Forestry Incentives Program
FLM: Federal Land Manager
FSM: Forest Service Manual
HRP: Human Resources Program
K-V: Knutson-Vanderberg Act
LWCF: Land and Water Conservation Fund Act
MIH: Management Information Handbook
NEPA: National Environmental Policy Act
NFMA: National Forest Management Act
NFS: National Forest System
O&C: Oregon and California
OMB: Office of Management and Budget
OSHA: Occupational Safety and Health Administration
P&M: Protection and Maintenance
SCS: Soil Conservation Service
SEA: Science and Education Administration
S&PF: State and Private Forestry
TSI: Timber Stand Improvement
USC: United States Code
RARE II: Roadless Area Review Evaluation II
RFA: Rural Forestry Assistance
YACC: Young Adults Conservation Corps
YCC: Youth Conservation Corps

ACKNOWLEDGMENT

This document is the culmination of the efforts of many people and records the consensus of their discerning judgments.

Its contributors are too numerous to acknowledge singly. They include hundreds of respondents who participated in the public involvement sessions held nationwide and the many reviewers whose positive suggestions helped shape and refine this publication.

Executives within the U.S. Department of Agriculture and other Departments; officers of the Forest Service and other Federal, as well as State, agencies; university faculty members; and members of the Nation's leading conservation and industrial organizations all made meaningful contributions to this Recommended Program--1980 Update required by the Resources Planning Act of 1974. Their assistance is gratefully recognized. Acknowledgment is also made of those who contributed in other important ways, including those who helped design and those who helped publish this document. (The names that follow are Forest Service members unless otherwise stated.)

These are the principals involved in writing and organizing this document:

Richard Benjamin, overall manager; Rob Gibson, preface; Robert Biesterfeldt, introduction; Arthur Schipper, Roger Leonard, and Richard Benjamin, chapter 1; Richard Benjamin, chapter 2; Lee Cromley, chapter 3; Phillip R. Haug, chapter 4; Sterling Wilcox, chapter 5; and Arthur Schipper, appendixes.

These are resource and complementary area contributors:

Jim Bossi, Recreation and Wilderness; Bob Phillips, Wildlife and Fish; Richard Ross, Range; Gene Rocky and Charles Irby, Soil and Water; Marlin Hughes, John Sessions, George Dutrow, and Mike Skinner, Timber; Wayne Patton, Minerals; Dave Heerwagen, Human and Community Development; Charles Lundeen, Bob Phelps, and Joe Baker, Protection; Melvin Yuhas, Lands; Frank Hammond, Facilities; Jack Thompson and Bill Cannon, Rural Forestry Assistance; Clyde Fasick, E. L. Shafer and the Washington Office Research Staff Director RPA representatives, Research. Also contributing from Research were the Planning and Application Assistant Directors of the eight Forest Experiment Stations; the Forest Products Laboratory; and R. F. Callahan and the Research Program-Assessment Team.

Other substantive contributors:

Richard Dyrland, Chris Avery, and Rick Ullrich, Output, Activity and Cost Data; Fred Kaiser, Adrian Haught, Stuart Gresswell, C. Y. Cho, and John Sessions, Economic Analyses; Gene Herring, Returns to Government; Ron Thompson and Lynn Vancil, Budget and Work Force; Susan Yonts, Public Involvement; Bill Guerds, Kent Mays, and the Interdisciplinary Team, Environmental Effects; the Assessment Lead Team, Supply and Demand; and Tom Hamilton, reviewer.

Graphics Backup:

Phillip Haug, Denise Reynolds, and Margaret Carter Dekalb, Tables and Charts.

Editors:

Rob Gibson and Robert Biesterfeldt.

Special Category:

John Fedkiw, associate director, Special Studies and Renewable Resources, U.S. Department of Agriculture, whose review consultations and specific recommendations earn special recognition.

PREFACE

This Program for forest and rangeland renewable resources crosses the threshold of the 21st Century.

It is the second Forest Service Recommended Program (for implementation in 1981) prepared in response to the Forest and Rangeland Renewable Resources Planning Act of 1974. It responds to the projected renewable resource situation documented in its companion Assessment ("An Assessment of the Forest and Range Land Situation in the United States"). The Act calls for a Program every 5 years and an Assessment every 10 years, covering at least 4 decades.

The future of the Nation's forest and rangeland renewable resources is dependent upon how well the resources are protected and managed and how carefully their uses are planned for the current and future generations. The development and preparation of the Recommended Program, as required by the Resources Planning Act (RPA) is the responsibility of the Secretary of Agriculture. The analyses and planning for forest and rangeland renewable resource assessments and program proposals is the responsibility of the Forest Service in the U.S. Department of Agriculture. A companion Act, the Soil and Water Resources Conservation Act of 1977 also emphasizes the role of the U.S. Department of Agriculture as steward of the Nation's renewable resources. The Resources Conservation Act (RCA) is administered by the Department's Soil Conservation Service. An Appraisal that inventories the Nation's soil, water, and related resources, and a Program developed in response to the Appraisal, will be prepared by that Agency every 5 years beginning in 1980.

Concerned citizens participated in the planning for the first RPA Recommended Program in 1975 as well as this one. Citizens' views were sought at meetings held nationwide. Written as well as oral comments, suggestions, recommendations, and critiques were reviewed, evaluated, and used in shaping this 1980 update. Other Federal agencies, State agencies, academic institutions, and public and private concerned groups and organizations also participated in the RPA planning process.

This "Recommended Renewable Resources Program--1980 Update" and its companion, "An Assessment of the Forest and Range Land Situation in the United States," are supporting technical documents for "The 1980 Report to Congress on the Nation's Renewable Resources" that was submitted by the Secretary of Agriculture to the President (for transmittal to Congress) early in 1980.

The Recommended Program described in the 1980 Report to Congress includes the essential elements of an environmental impact analysis and meets the requirements of the National Environmental Policy Act (NEPA) of 1969.

INTRODUCTION

This document describes a Recommended Program for the Forest Service, U.S. Department of Agriculture. It charts a course that assures more effective use of the Nation's forest and rangeland resources beginning in 1981 and continuing through 2030. It also explains how the Program was developed, including the alternatives considered in the Program's formulation. This publication, and its companion publication, "An Assessment of the Forest and Range Land Situation in the United States," present in detail the Program and Assessment, and the planning processes they represent, as required by the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, as amended.

The 1980 RPA documents address the period 1981-2030. Three draft documents were prepared for review and distributed in early 1979:

An Assessment of the Forest and Range Land Situation in the United States;

Alternative Program Directions, 1981-2030; and

A Report to Congress on the Nation's Renewable Resources--RPA Assessment and Alternative Program Directions.

Following public review during 1979, the analyses and planning included in the three draft documents were revised for submission to Congress early in 1980.

The recommendations presented here are based upon the Assessment, the results of extensive public involvement, numerous analyses, discussions with conservation leaders, representatives of Congress, and decisions by policy level officials in the Administration. The Program is shaped in part by necessary constraints on personnel ceilings and total budgets, but within these constraints it is balanced, cost-effective, environmentally sound, and responsive to current and projected needs.

Noteworthy throughout this document, data are presented for the major Forest Service geographic and administrative units. The map on page x shows the boundaries, titles, and numerical designations for Regions of the National Forest System (NFS). The territory for the State and Private Forestry North-eastern Area is identical to that of the NFS Eastern Region (Region 9); that of the State and Private Forestry Southeastern Area is identical to that of the NFS Southern Region (Region 8). State and Private Forestry programs in the rest of the Nation are administered by the individual Forest Service Regional Foresters. The U.S. areas served by the Forest Service Experiment Stations are shown on page xi.

The supply-demand situation reported in the 1979 Assessment is described nationally and by geographic sections and regions. For comparative purposes, the sections and regions (see map on page xiii) can be related to Forest Service administrative unit boundaries as depicted in this document. For example, the Rocky Mountains and Great Plains Section is comparable to the Forest Service administrative Regions 1, 2, 3, and 4, while the North Section can be directly compared to the National Forest System and State and Private Forestry administrative unit boundaries.

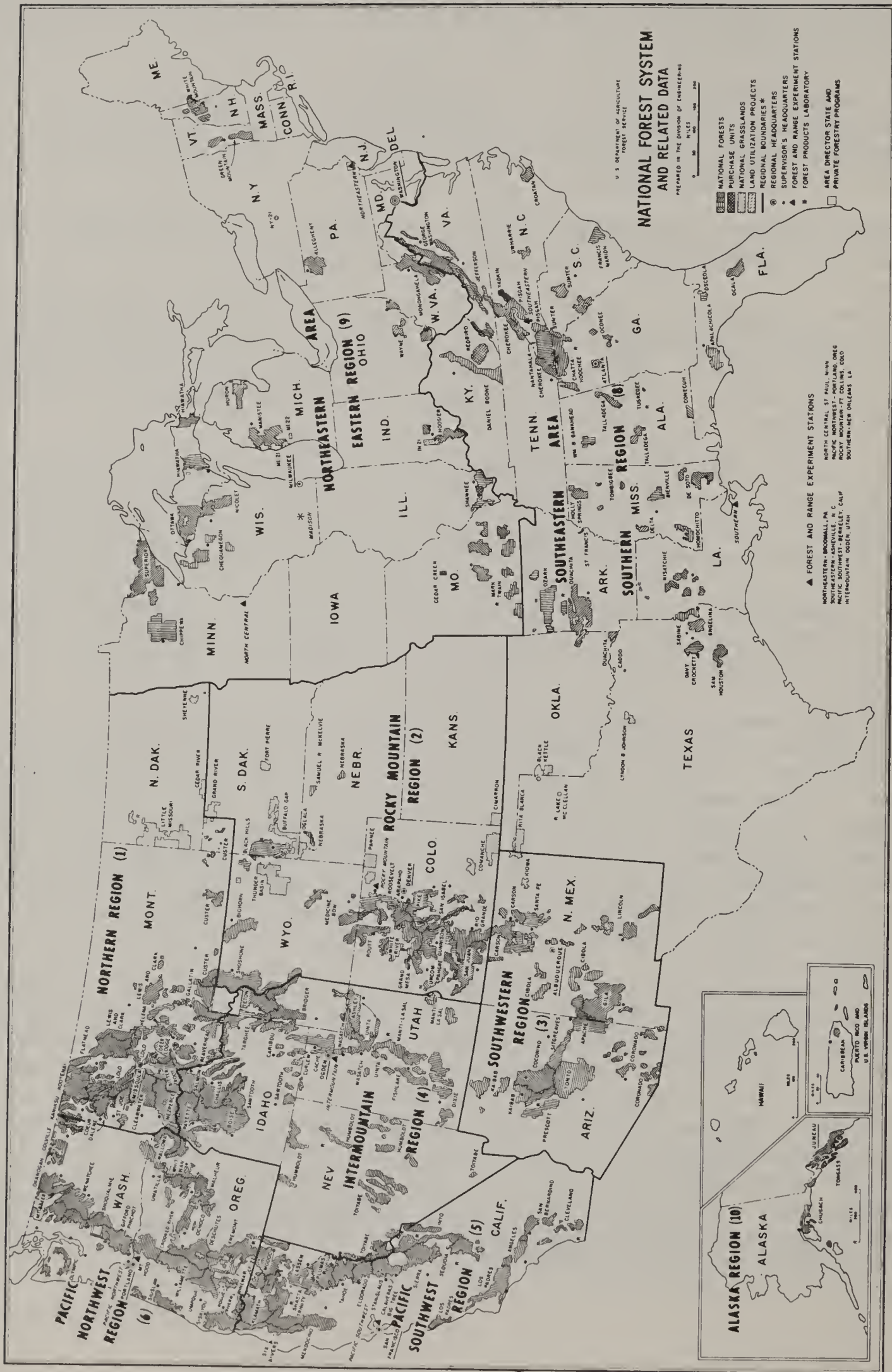
Forest Service Roles

Measured in numbers of employees, size of budget, amount and diversity of professional expertise, the Forest Service is by far the largest forest conservation organization in the United States. The Agency's size, however, is no greater than its responsibilities. It is expected to provide national leadership in forest conservation policies and programs. The Resources Planning Act, section 2 (6), states:

" . . . the Forest Service, . . . has both a responsibility and an opportunity to be a leader in assuring that the Nation maintains a natural resource conservation posture that will meet the requirements of our people in perpetuity;"

In carrying out this responsibility, the Forest Service engages in a wide variety of activities that fit into four major categories:

1. Administration of about 187 million acres of Federal land within the National Forests, the National Grasslands, and other smaller units of the National Forest System. These lands are protected and managed for sustained yields of a variety of products and services including wood, water, wildlife, forage, wilderness, and outdoor recreation.
2. Financial, technical, and related assistance to State forestry organizations and other cooperators through State and Private Forestry programs. These programs include rural forestry assistance on non-Federal forest lands; forestry incentives on nonindustrial private forest lands; forest insect and disease control on all lands; forestry assistance for urban and smaller communities; rural fire prevention and control on non-Federal forest lands and other rural lands; management and planning assistance to State Foresters or equivalent State officials and technology implementation assistance.
3. Development of technology and information from basic and applied research to improve protection, management, and use of renewable natural resources on Federal, State, and other public and private lands. Research is conducted at eight regional experiment stations and the Forest Products Laboratory. More than 1,000 Forest Service scientists support this effort. Much of the research conducted is of national and international significance. The Forest Service cooperates with other Federal research agencies, forestry organizations, universities, and scientists in the United States and other countries on a variety of mutual problems and opportunities.
4. Participation in several cooperative programs that provide employment training, and work experiences for young, elderly, and disadvantaged persons. These programs include the Youth Conservation Corps jointly administered by the Departments of Agriculture and Interior; the Job Corps Civilian Conservation Centers and the Senior Community Service Employment Program administered by the Forest Service under an agreement with the Department of Labor; and the Young Adult Conservation Corps jointly administered by the Departments of Agriculture and Interior under agreement with the Department of Labor. In addition to providing employment and training to enrollees these programs provide supplementary work forces and supplies that help Forest Service Research, State and Private Forestry, and the National Forest System.



LEGEND

- ★ NATIONAL HEADQUARTERS
- EXPERIMENT STATION HEADQUARTERS
- ▲ FOREST PRODUCTS LABORATORY

INSTITUTE OF PACIFIC ISLANDS FORESTRY

PACIFIC NORTHWEST

PACIFIC SOUTHWEST

INTER MOUNTAIN

ROCKY MOUNTAIN

NORTH CENTRAL

NORTHEASTERN

SOUTHEASTERN

SOUTHERN

HAWAII

Puerto Rico

Rio Piedras

Virgin Islands

- ★ NATIONAL HEADQUARTERS
- EXPERIMENT STATION HEADQUARTERS
- ▲ FOREST PRODUCTS LABORATORY
- RESEARCH PROJECT LOCATIONS

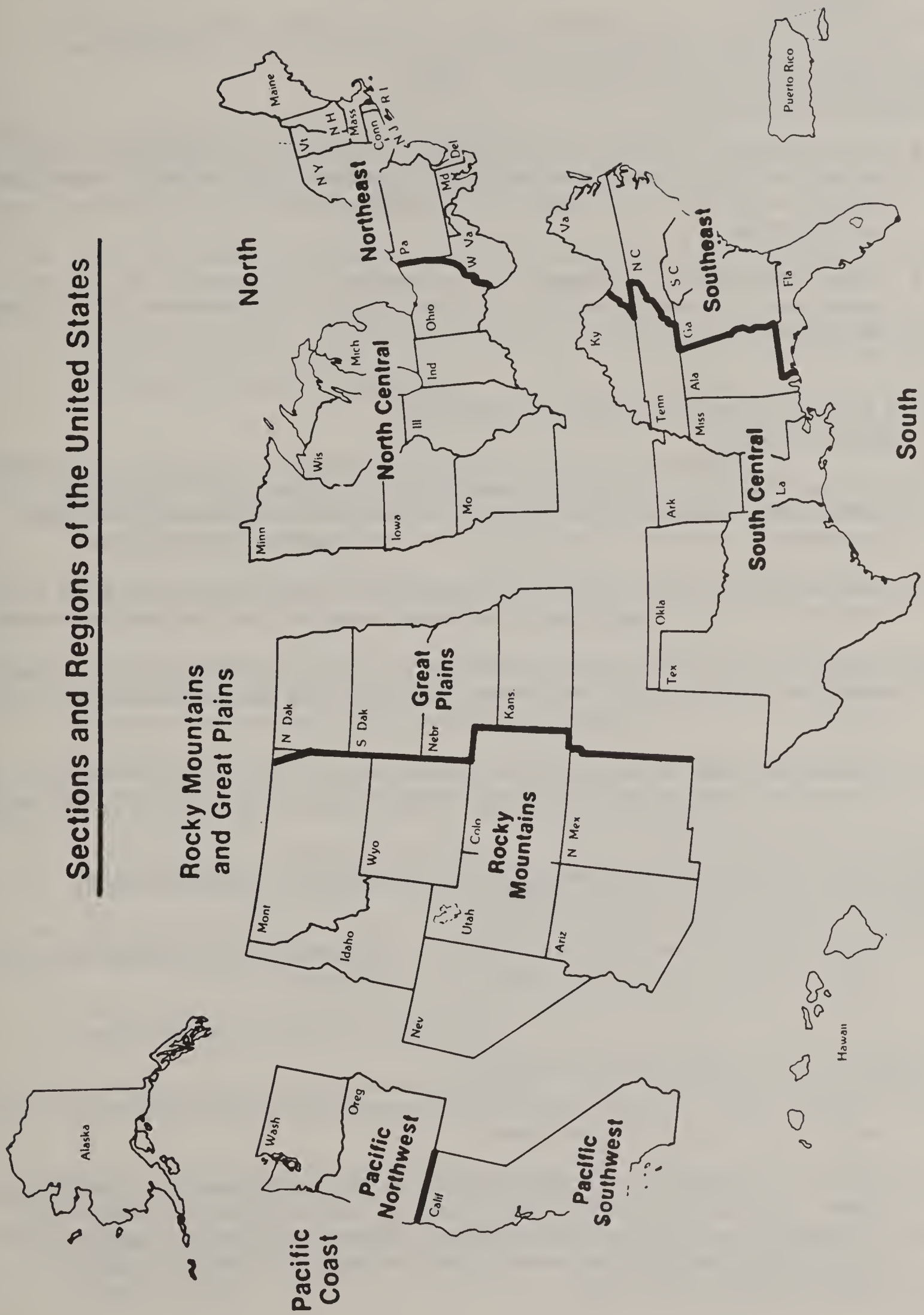
Forest Service Principles and Guidelines

The principles that have historically guided the Forest Service in carrying out its responsibilities are described below. The policy statements that accompany each principle are not a complete list; they are intended to illustrate some of the implications of these Forest Service roles and to provide, along with the Recommended Program, a framework for the more specific policy development that is a continuing requirement at all levels within the Forest Service.

Promote and Achieve a Pattern of Natural Resource Uses that Will Best Meet the Needs of People Now and in the Future

- Promote multiple-use management on National Forest System lands and on other ownerships, where applicable.
- Protect public and private forest resources, commensurate with the values involved.
- Emphasize protection of significant examples of ecological, archeological, geological, and historical interest.
- Share expertise of specialties where the Forest Service constitutes the prime source of experience and skills--for example, in timber, wilderness, winter sports, and forest landscape management.
- Advance the development of grassland agricultural resources for the benefits of multiple use-sustained yield management within areas of which the National Grasslands are a part, and demonstrate practical land use practices suitable for use on associated State and private lands.
- Cooperate with other Federal, regional, State, multicounty, and county agencies in resource management, and in planning and economic development programs.
- Develop and encourage national programs that meet the Nation's need for timber.
- Provide a variety of forest recreation opportunities for the public.
- Help ensure water yields of the quality and quantity needed.
- Help meet the Nation's needs for wilderness and other special environments by carrying out scientific management of such areas, and by developing classification alternatives that provide a variety of opportunities.
- Provide quality wildlife and fish habitats that contribute to the mixture of types and numbers that respond to public preferences. Emphasize the protection of endangered and threatened species of native animals and plants.

Sections and Regions of the United States



- Seek to expand opportunities for grazing on public and private range lands that efficiently serve the welfare of local residents and communities.
- Help ensure mineral development with adequate protection of surface resources.

Protect and Improve the Quality of Air, Water, Soil, and Natural Beauty

- Extend research efforts to establish the base of knowledge and techniques necessary to better establish, protect, and maintain trees and related vegetation to improve environmental quality in urban and community areas.
- Promote and develop cooperative arrangements designed to assure adequate use of forestry skills and techniques in improvement of the urban environment.

Generate Forestry Opportunities to Accelerate Rural Community Growth

- Work with public and private agencies to provide public services, income, jobs, and amenities in rural areas through planning, resource management, economic development, and job opportunity programs.
- Seek opportunities to develop forest-based enterprises that will contribute to rural growth rates at least equal to the national average.
- Identify and promote opportunities for community development, including new towns, and ensure that Forest Service programs contribute to their growth.
- Provide maximum opportunity for demonstrating effective development of the natural, economic, and social resources in National Grassland areas.

Encourage the Growth and Development of Forestry-Based Enterprises that Can Respond to Consumers' Changing Needs

- Foster competition and efficiency in industries that channel forestry-based services, uses, and products to consumers.

Seek Optimum Forest Landownership Patterns

- Actively seek a role in public decisions affecting allocation of land among forest and nonforest uses.
- Round out the National Forest System by land purchase or exchange or other land use adjustments where public ownership and interests will efficiently advance public benefits. Study and identify opportunities to add to, or eliminate, areas from the National Forest System to assure optimum land use.

- To the extent feasible, integrate the Federal land with associated private and other public land into natural management units which will favorably influence development of sound land conservation and utilization practices.
- Encourage the combination of small private forest landownerships into economically viable units for resource management and production.

Improve the Welfare of Underprivileged Members of Society

- Use forestry activities to help minority, economically depressed, elderly, handicapped, and youth groups.
- Provide forest recreational opportunities that meet the special needs of the physically handicapped or economically underprivileged.
- Encourage States, other public bodies, private landowners, and industries to give special consideration and assistance to disadvantaged persons in forestry programs.

Involve the Public in Forestry Policy and Program Formulation

- Seek out and obtain local and national views on the process of policy and program formulation.
- Discharge Forest Service responsibilities to make management processes visible and responsible personnel accessible.
- Consult, and seek cooperative action with agencies at all levels of government, and with private groups and individuals, in programs for resource management and economic development.

Encourage the Development of Forestry Throughout the World

- Provide highly competent personnel to help developing Nations establish sound forestry programs.
- Work through international programs to acquire and exchange forestry knowledge and ideas.
- Participate in and provide leadership to international groups and organizations fostering forestry.
- Work with and through other agencies and organizations in formulating policies on world trade relating to forestry.

Expand Public Understanding of Environmental Conservation

- Support efforts to provide information to the general public on the vital role and values of forestry and related environmental conservation.

- Cooperate with and encourage other Federal, State, and private organizations in the development of conservation education programs.
- Provide assistance to the Nation's educational system in developing effective methods for teaching conservation principles.
- Encourage use of National Forest System Lands for conservation education.

Develop and Make Available an Adequate Scientific Base for the Advancement of Forestry

- Conduct research programs needed to ensure the rapid and efficient advancement of programs aimed at obtaining optimum benefits from forest resource management, protection, and utilization.
- Promote research in forestry through cooperative programs with educational institutions and other public and private organizations.
- Make research results rapidly and equally available through information, education, demonstration, and technical assistance.
- Foster relationships between research scientists and forest managers that facilitate joint implementation of research results.
- Support professional and vocational education in forestry and related disciplines.
- Support professional societies in forestry and those related to forestry.
- Support research and administrative studies on National Grasslands as an applied rangeland laboratory.

Encourage Program Coordination among USDA and other Government Departments

- Promote coordination arrangements among government departments that can make the most effective use of USDA programs.
- Provide for interagency participation and coordination in working groups that develop and review Forest Service projects to obtain maximum effectiveness and consistency with related Federal efforts and interests.

Program Elements

In this document, all Forest Service activities are grouped into 12 elements: 8 represent individual resources (recreation, wilderness, wildlife and fish, range, timber, water, minerals, and human and community development) and 4 represent types of program support (protection, lands, soils, and facilities). Resource elements encompass activities that benefit specific resources. Support elements include activities that do not primarily benefit a single

resource. Support activities are necessary to maintain and facilitate outputs of several or all resources.

Resource Elements (encompass activities that benefit specific resources):

Recreation.--This element includes all activities necessary to: protect, administer, and develop outdoor recreational opportunities within the National Forest System (except for lands formally designated as Wilderness) so that they meet their appropriate share of the Nation's existing and anticipated demand compatible with other resource values; protect, manage, and provide trails and other access to the scenic and cultural resources within the National Forest System; conduct research to improve the effectiveness of providing and managing outdoor recreational opportunities; and to provide technical assistance and advice through appropriate State agencies to non-Federal landowners for dispersed recreation.

Wilderness.--This element includes all activities needed for the study, administration, and management of the Wilderness System. National Forest System wildernesses are administered for the continuing use and enjoyment of the American people, to preserve their wilderness character, and to provide a source of scientific and other information related to wilderness.

Wildlife and fish.--Activities within this element provide for productive wildlife and fish habitats, with special emphasis on endangered and threatened species. Management of habitats is closely coordinated with the States, who have prime responsibility for managing wildlife and fish populations. Close working relations must be maintained among managers of National Forest System units and other Federal, State, and private land managers. The element includes activities necessary to protect, administer, and develop National Forest System wildlife and fish habitats; to assist non-Federal land managers through cooperative forestry programs; and to develop new knowledge through research on environmental requirements of wildlife and fish.

Range.--This element includes activities needed for sustained use of range ecosystems by livestock and other herbivores on forest and rangelands commensurate with other commodity, environmental, social, and esthetic needs. Ecological and management information about range ecosystems is provided for nonlivestock purposes, such as protecting endangered plants and wild free-roaming horses and burros. This element also includes activities that bear directly upon management, use, and protection of National Forest System range resources; cooperative activities for the use and improvement of non-Federal forested ranges; and research to provide a sound technical and ecological base for range management, use, rehabilitation, and protection.

Timber.--Activities within this element are concerned with the growth, cultivation and utilization of wood and wood products to help meet the Nation's short- and long-term needs. It includes management activities on National Forest System land and on non-Federal lands, as well as research that contributes to the improvement, growth, and timely and efficient harvests of timber, compatible with other resource values; the efficient processing and utilization of wood and wood-related products; and the development of better management methods through research.

Water.--This element includes activities that protect, conserve, and enhance water resources within the National Forest System compatible with other

resource values. It includes watershed and river basin planning and development, in cooperation with States and other agencies, designed to increase knowledge about the water resource. Included also are research and cooperative activities to meet water quality standards onsite and offsite by reducing pollution and improving the amount and timing of water flows.

Minerals.--This element includes activities that relate to the exploration and development of mineral resources within National Forest System lands, consistent with other resource values. Research and cooperative activities related to the reclamation of mined lands are also included.

Human and community development.--This element is concerned with activities designed to help people and communities help themselves. It includes activities that provide youth development through resource conservation work and learning experiences; adult employment and training opportunities through various Federal human resource programs; rural community planning and development information and services; and technical forestry assistance and research for urban areas in the establishment, management, and protection of open space, and the use of trees and shrubs.

Support Elements (include activities that do not primarily benefit a single resource but are necessary to maintain and facilitate outputs of other resources):

Protection.--This element includes activities that provide for prevention and control of insects, diseases, and wildfires. Law enforcement and other aspects of resource and community protection are also included.

Lands.--Activities within this element provide for land management planning, administration of special land uses (except for recreation-related special uses), land ownership adjustments, title claims, occupancy trespass, transfer of administrative jurisdictions, property line surveys, and multi-resource studies of the existing National Forest System and new areas. It also includes State forestry resource planning assistance. Research within this element provides new knowledge for improving multiresource surveys and economic analyses, and planning for alternative uses of the Nation's forest and rangelands.

Soils.--This element includes activities that provide for protection, conservation, and enhancement of soil productivity of forest and rangelands. It includes research, surveys, protection, rehabilitation, and improvement activities directed toward non-Federal as well as National Forest System lands.

Facilities.--Activities within this element provide and maintain capital improvements such as buildings, roads, fences, bridges, dams, and airfields that are not identifiable in support of any single element.

Multiple Resource Interactions

For the recommended program and its alternatives, costs, activities, and benefits are presented for each element. These values reflect complex

interactions among resource elements. It is usually impossible to increase emphasis on one resource without influencing others. For example, large increases in land allocation to the National Wilderness Preservation System have consequences on timber and other potential outputs. These complex interactions were recognized and considered when formulating the goals and targets and in assessing their environmental impacts. Multiple resource interaction relationships are discussed in the 1979 Assessment document.

History of Long-Range Forest Planning

The Forest and Rangeland Renewable Resources Planning Act of 1974 is important in the history of Federal Government inventories of, and long-term planning for, natural resources. A brief review of other milestones in natural resource planning before and since the 1974 Resources Planning Act helps put the 1980 RPA process in perspective.

1837 The Massachusetts Legislature authorizes survey of that State's forest conditions with view toward encouraging landowners to improve forests.

1867 The Michigan and Wisconsin Legislatures provide for inquiries into forest conditions and needs.

1869 A forestry committee is appointed in Maine to develop that State's forest policy.

1876 Congress appropriates \$2,000 to employ an expert to study and report on forest conditions. Dr. Franklin B. Hough is appointed.

1877-83 Three comprehensive reports by Hough are submitted to Congress.

1881 A Division of Forestry is established in U.S. Department of Agriculture to ascertain facts about forests and forestry.

1891 The taproots of the National Forest System take hold and strengthen when the President is given power to establish forest reserves from the public domain.

1897 The Organic Act provides for the management and public use of the forest reserves.

1898 Gifford Pinchot, new head of the Division of Forestry, engages half the Division's employees in scientific studies.

1905 The Transfer Act provides for the transfer of forest reserves from U.S. Department of Interior to U.S. Department of Agriculture. Secretary of Agriculture Wilson writes to the Forest Service Chief: "In the administration of the forest reserves, it must be clearly borne in mind that all land is to be devoted to its most productive use for the permanent good of the whole people..."

1909 The National Conservation Commission, with Gifford Pinchot as chairman, publishes an inventory of the Nation's natural resources. Major sections are devoted to minerals, waters, forests, and soils.

1920 The Forest Service prepares a comprehensive report on the forest situation in the United States.

1927 The McSweeney-McNary Act directs the Secretary of Agriculture to assess the forest situation in the United States on a continuing basis.

1930 The first nationwide survey of forest resources and conditions begins. It is interrupted when the Nation enters World War II.

1933 At the Senate's direction, the Forest Service prepares A National Plan for American Forestry.

1935 A National Resources Committee is established to investigate the country's natural resources and to plan for their development and use.

1936 The Omnibus Flood Control Act provides for surveys and improvements of watersheds for flood control.

1941 A joint Congressional Committee on Forestry issues a report on Forest Lands of the United States.

1943 Comprehensive interagency river basin planning begins.

1947 The Forest Service completes a postwar reappraisal of the forest situation in the United States.

1952 A nationwide Forest Research Advisory Committee is established to advise the Forest Service on research program needs.

1954 The Watershed Protection and Flood Prevention Act authorizes the U.S. Department of Agriculture to cooperate with States and local agencies in watershed planning.

1958 The Forest Service publishes its Timber Resources Review.

1959 A long-term plan, Program for the National Forests, is submitted to Congress by the Secretary of Agriculture.

1960 The Multiple Use-Sustained Yield Act endorses the Forest Service policy of considering all renewable resources during planning and management.

1961 President John F. Kennedy sends a more comprehensive and expanded program to Congress. It is entitled Development Program for the National Forests.

1961 The Outdoor Recreation Resources Review Commission assesses the Nation's opportunities for recreation.

1964 The Forest Service and cooperators prepare a long-term plan called A National Forestry Research Program.

1964 The Wilderness Act recognizes 9.1 million acres of Wilderness on National Forests and creates the framework for designating additional areas of Federal land for the Wilderness System.

1969 The National Environmental Policy Act requires analyses of environmental impacts of significant actions and programs.

1970 The Forest Service states broad objectives and policies in Framework for the Future.

1973 The Forest Service publishes its Outlook for Timber in the United States.

1974 The Forest Service distributes a draft of a long-range national forestry program called Environmental Program for the Future.

1974 Congress enacts the Forest and Rangeland Renewable Resources Planning Act.

1976 The President transmits the first RPA Assessment and Recommended Program documents to Congress.

1976 The National Forest Management Act substantially amends the original Resources Planning Act.

1978 Congress enacts the Forest and Rangeland Renewable Resources Research Act calling for national and regional research planning. In response, regional and national conferences are held to determine needs and priorities.

1978 The Renewable Resources Extension Act and the Cooperative Forestry Assistance Act are passed. The first authorizes the Secretary of Agriculture (among many provisions) to develop and implement programs that give special attention to the educational needs of small, private nonindustrial forest landowners. The second authorizes the Secretary of Agriculture to assist State forestry agencies in preparing State forest resource plans.

1979 The National Association of State Foresters prepares long-term recommendations at regional and national conferences on private nonindustrial forest lands.

Document Organization

This document contains five Chapters and Appendixes:

Chapter 1 describes the Recommended Program.

Chapter 2 highlights the process used to formulate Alternative Program Directions, analyze and evaluate them, and determine the Recommended Program.

Chapter 3 describes the Alternatives considered in determining the Recommended Program.

Chapter 4 compares the Recommended Program with other Alternatives considered.

Chapter 5 describes the evaluations that led to selection of the Recommended Program.

The appendixes include detailed reference material on legislative requirements, public involvement, and economic analyses as well as a glossary.

CHAPTER 1:

Recommended Program



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CHAPTER 1: THE RECOMMENDED PROGRAM

The Forest and Rangeland Renewable Resources Planning Act (RPA) 2/ process, that requires an assessment and a program that responds to the assessment, is designed to ensure that this Nation's renewable resources will continue to make vital contributions to the quality of American life.

The 1979 RPA Assessment describes the resource situation on the Nation's forests and rangelands. It projects likely demands upon them, and their potential supplies. It identifies opportunities for management and protection of renewable resources, and describes the responsibilities as well as the programs of the U.S. Department of Agriculture's Forest Service and its relationship with other agencies involved in renewable resources management. The Assessment also identifies opportunities to increase outputs of renewable resource-related goods and services while maintaining long-term productivity of the land and water base. But identification of opportunities is not sufficient. Policies and planning decisions must define the opportunities that will be pursued, and establish effective procedures for realizing them.

The 1980 RPA Program provides guidance for the management and administration of the National Forest System, for Research, for cooperative State and Private Forestry programs, and for the conduct of other Forest Service activities in relation to findings of the Assessment.

As the Act points out (section 2 (5)), most of the Nation's forest and rangelands are under private ownership and State and local governmental management. The Nation's major capacity to produce goods and services is based on these non-federally managed renewable resources. The Federal Government should be the catalyst to encourage and assist these owners and managers in efficient and long-term use and improvement of the renewable resources contained on their lands.

In this chapter, the Forest Service recommends a Program that responds to the findings and projections in the 1979 RPA Assessment. It is divided in four major parts:

Part I presents a brief overview of the Program in terms of Forest Service roles, goals, activities, outputs, costs 3/, and environmental effects.

Part II describes the Program for each of 12 program elements. Within each element, the Program is described in terms of goals and a range of activities and outputs for the National Forest System, State and Private Forestry, Research, and Human Resource Programs.

2/ 92 Stat. 353; 16 U.S.C. 1600.

3/ Throughout this document, costs and benefits are in terms of constant 1978 dollars.

Part III summarizes the estimated environmental effects of the Program in terms of economic, physical-biological, and social effects.

Part IV describes significant differences from the 1975 Recommended Program, the major policy issues considered during formulation of the 1980 Program, and the planning environment surrounding the development of the 1980 Program.

PART I: THE 1980 RECOMMENDED PROGRAM--AN OVERVIEW

The Program is characterized by the High and Low Bound of a range of resource activities and production. The High Bound would substantially increase the supply of renewable resources while providing increased protection of environmental values. The Low Bound places renewable resource programs in the context of the current economic situation that calls for constrained Federal spending and so provides for more modest outputs. The Recommended Program range embodies what is judged to be a balanced and reasonable plan for managing this Nation's renewable resources for the foreseeable future. The Program is intended to provide many of our future renewable resource needs with considerations of relative benefits and costs.

Under this Program, the Forest Service will continue to have four major responsibilities: administration and management of the National Forest System (NFS), technical and financial assistance to the State and Private Forestry sector (S&PF), renewable natural resource Research, and administration of Human Resource Programs.

National Forest System

National Forest System programs protect and manage about 187 million acres of Federal forest and rangeland to provide the American people with a wide variety of goods and services, including fish and wildlife, timber, recreation, wilderness, forage, water, minerals, cultural, and historic resources.

At the Low Bound of the Program, recreation use receiving full recreational services on National Forests would decline to a low point in 1985 of providing for 183 million recreation visitor days annually. Beginning in 1985, management would gradually increase to provide full recreational services for 308 million visitor days annually by 2030. At the High Bound, the Program would expand the recreation program of full services beginning in 1982, reaching an expected 255 million recreation visitor days annually by 1985 and nearly 400 million by the year 2030.

Congressional designations of National Forest wildernesses are estimated at about 33 million acres by 1985 at the Low Bound. At the High Bound, wilderness acreage would be 41 million acres by 1985. Both the Low and High Bounds would anticipate an increase in wilderness of an additional million acres between 1985 and the year 2030.

Wildlife and fish habitat on National Forests would improve. For example, habitat management is expected to increase populations 20 percent for mule deer, 20 percent for white-tailed deer, 25 percent for black-tailed deer, 18 percent for elk, 33 percent for turkey, 10 percent for cavity-nesting birds, 20 percent for resident trout, and 30 percent for anadromous fish by 1995 at the High Bound. At the Low Bound all species of deer show a 5 percent decline by 1995, as do cavity-nesting birds and resident trout; elk decline 10 percent and turkey remain stable. Anadromous fish show a 5-percent increase because of special emphasis given that group.

Emphasis would be on efficient production and improvement of rangeland condition. At the High Bound, range use would be maintained at about the current level through 1995. After that, improved rangeland conditions would

provide for increased use of over one-half million animal unit months (AUM) to about 10.6 million AUM after 2000 on the National Forest System. At the Low Bound, range use would initially decline 0.6 million AUM by 1985; however, after 1990, range use at both Bounds would converge and be identical by 2000.

Timber sale offerings from the National Forests are planned at 11.9 billion board feet in 1981. At the High Bound, sale offerings would increase to approximately 12.5 billion board feet, local scale, in 1985, and to more than 16.4 billion board feet by 2030. At the Low Bound, sale offerings would decline to 11.0 billion board feet in 1982 and remain at that level until 1990; thereafter sale offerings would increase, reaching 13.2 billion board feet by 2030. Departures from nondeclining evenflow, which will be evaluated during the updating of National Forest management plans between 1980 and 1985, could increase the timber harvest on a temporary basis during the decade of the 1980's.

Water and minerals make up about one-half of the value of market assets on the National Forest System. Management of forest cover will continue to emphasize clear, clean water production. Mineral extraction and production is expected to increase steadily in response to national needs for energy and other uses.

The National Forest System will continue to be managed under multiple use-sustained yield policies that seek optimum use of the land and its resources and assure a continuous supply of goods and services. Land and resource management plans will be developed as required by regulations 4/ recently developed pursuant to the National Forest Management Act of 1976. 5/

Goals.--The following major Program goals will guide implementation of the Recommended Program on the National Forest System (more specific resource and support element goals and objectives appear in part II of this chapter):

- Continue to provide for the current relative national share of developed outdoor recreational opportunities and use.
- Emphasize energy efficiency in public and private sector recreation programs by making recreation opportunities on National Forest System lands more accessible, usable, and enjoyable for urban residents and special populations.
- Facilitate safe, satisfying opportunities for National Forest visitors to know and experience nature.
- Provide high quality wildernesses that contain values for primitive recreation, solitude, naturalness, science, education, and history.
- Provide the habitats, populations, species diversity, and distributions of wildlife and fish that respond to known public interests and preferences; meet ecosystem management objectives to assure that

4/ USDA Forest Service. National forest system land and resources management planning regulations. (36 CFR 219.) September 17, 1979.

5/ 90 Stat. 2949; 16 U.S.C. 1601-1614.

species requiring special habitats do not become endangered or threatened because of human activities.

- Improve the status of endangered and threatened species so that they no longer need the protection of the Endangered Species Act of 1973. 6/
- Provide a program that provides major improvements in anadromous fish habitat.
- Achieve an equilibrium between grazing use and range productivity on lands where forage production and use can be made cost-efficient; protect and improve the values on these lands.
- Increase total timber supply from the National Forests by intensively managing lands where timber production is cost effective.
- Increase efforts to protect and improve water quality on the National Forest System and apply sound watershed management practices to avoid excessive water runoff, and reduce the consequences of low stream flows.
- Accelerate the development of National Forest System mineral resources with appropriate environmental safeguards.
- Continue to support and participate in employment and training programs for youth, older Americans, and the disadvantaged in response to national employment and training needs and opportunities existing in forestry.

Outputs, activities, and costs.--The key outputs and activities for the National Forest System are displayed in table 1.1. Fiscal year 1978 is a base for comparison, and projections are made for the period 1981-2030. Operational and capital investment costs (in constant 1978 dollars) are presented for these same time periods. Both the High and Low Bound are presented for all categories. These Bounds encompass a range of options in order to identify desirable resource goals and, at the same time, accommodate fiscal uncertainty and changing national needs. Additional explanations on how the Bounds were determined are presented in chapter 5.

Distribution of costs among Program elements for the National Forest System is shown in table 1.2. Estimated average annual costs are shown for the period 1991-2000. These estimated costs include dollars appropriated directly to the Forest Service and dollars allocated to the Forest Service from other agencies' appropriations. The period 1991-2000 was selected for display because it is far enough into the future to show significant trends, but close enough to the present to be useful in planning.

The Program elements are not mutually exclusive. There is a large degree of interdependence among elements. Actions taken to accomplish the goals of any one element influence other elements. The interrelationships among the Program elements is complex. Land and resource managers are constantly challenged to better understand these dynamic interrelationships in their day-to-day decisions. A discussion of multiple resource interactions is presented in

6/ 87 Stat. 884; 16 U.S.C. 1531 et seq.

**Table 1.1--Projected National Forest System Program outputs,
activities, and costs--Recommended Program**

Program element and activity	Unit of measure	Base year 1978	Range	Annual units									
				1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
RECREATION													
Developed Recreation Use (Includes VIS)	Million RVD	79.6	High Low	82	89 75	92 73	94 71	97 69	102 72	112 88	128 105	141 120	155 125
Dispersed Recreation Use (Includes Wildlife & Fish)	Million RVD	130.2	High Low	132	143 117	148 116	153 115	158 114	171 122	184 135	208 160	225 175	283 183
Trail Construction/ Reconstruction	Miles	600	High Low	515	2331 300	2282 290	2238 280	2127 250	2171 300	2272 1000	2302 1500	2398 1900	2530 1900
WILDERNESS Wilderness Mgmt.	Million acres	15.3	High Low	33	39 33	40 33	41 33	41 33	42 34	42 34	42 34	42 34	42 34
WILDLIFE & FISH Wildlife Habitat Improvement	Thousand acre equivalents	2333	High Low	1302	2896 1190	3016 1190	3130 1190	3275 1190	3015 1540	2558 1930	2108 1510	1442 1100	1418 1140
Anadromous Fish Improvement	Thousand pounds	NA	High Low	--	210 42	581 138	1675 480	3753 1300	9680 3700	19586 10600	25494 13900	25494 13900	25494 13900
RANGE													
Grazing Use (Livestock)	Million AUM	9.9	High Low	10.0	9.9 9.8	10.0 9.6	10.0 9.5	10.1 9.4	10.1 9.4	10.1 10.0	10.2 10.2	10.3 10.3	10.6 10.6
TIMBER													
Programmed Sales Offered	Billion board feet	12.2	High Low	11.9	11.9 11.0	12.1 11.0	12.2 11.0	12.5 11.0	12.9 11.0	13.7 12.5	14.9 12.7	15.8 13.0	16.4 13.2
Reforestation	Thousand acres	411.3	High Low	460	463 370	469 357	469 357	470 345	431 426	446 382	461 394	477 409	492 420
Timber Stand Improvement	Thousand acres	420	High Low	338	412 332	414 331	408 330	408 286	366 284	386 250	413 251	418 253	426 255
WATER													
Meeting Water Quality Goals	Million acre feet	370	High Low	373	403 403	404 404	406 406	407 407	412 412	417 416	421 421	421 421	421 421
MINERALS Minerals Leases and Permits	Thousand operating plans	14.5	High Low	17	20 18	21 19	23 20	24 20	27 22	30 24	34 26	37 29	38 31
HUMAN & COMMUNITY DEVELOPMENT													
Human Resources Programs 1/	Thousand enrollee years	14.8	High Low	12	18 14	18 14	18 13	18 13	5 0	5 0	5 0	5 0	5 0
PROTECTION													
Fire Management Effectiveness Index	Dollars/ thousand acres	1111	High Low	1110	1340 1550	1330 1560	1320 1570	1310 1570	1295 1524	1290 1370	1275 1300	1270 1300	1265 1270
Fuelbreaks & Fuel Treatment	Thousand acres	392	High Low	164	306 161	330 162	333 162	337 160	326 170	296 217	297 258	301 271	390 283
LANDS													
Land Purchase and Acquisition (Excludes Exchange)	Thousand acres	117	High Low	50	222 186	219 184	205 179	222 175	371 306	101 67	132 103	163 134	178 145
SOILS													
Soil & Water Resource Improvement (Improved Watershed Condition)	Thousand acres	4.2	High Low	8	28 12	30 12	32 13	33 13	34 17	35 17	32 17	27 18	27 18
FACILITIES													
Road Construction/ Reconstruction (Arterial Collector)	Miles	686	High Low	72	624 310	715 340	761 350	834 334	1055 577	1332 820	1100 1070	970 970	554 391
Returns to Government	Million dollars 2/	1116	High Low	1692	1837 1692	1988 1809	2140 1923	2292 2035	2675 2235	3058 2895	4346 3745	5633 4595	6921 5445
WORKFORCE													
	Thousand staff years	40.3	High Low	52.5	62.7 53.2	64.8 53.2	66.3 52.9	68.2 52.8	69.4 55.5	66.5 53.5	67.8 54.4	69.5 55.3	70.5 54.6
COSTS													
Operational	Million dollars	676	High Low	644	719 600	747 600	764 603	792 606	1054 779	1167 953	1194 979	1230 996	1281 1021
Capital Investments 4/	Million dollars	685	High Low	788	1075 863	1101 856	1147 844	1178 832	1067 861	1128 894	1147 899	1169 911	1153 1021
Backlog 5/	Million dollars	61	High Low	40	55 51	54 47	50 46	43 36	32 28	29 22	-- --	-- --	-- --
Total Appropriated 6/	Million dollars	1422	High Low	1472	1794 1463	1857 1456	1911 1447	1970 1438	2121 1640	2295 1847	2341 1878	2399 1907	2434 1883
Allocated Funds 7/	Million dollars	244	High Low	194	377 377	386 386	384 384	389 389	279 279	5 5	5 5	5 5	5 5
Total NFS	Million dollars	1666	High Low	1666	2171 1840	2243 1842	2295 1831	2359 1827	2400 1919	2300 1852	2346 1883	2404 1912	2439 1888

1/ Human Resource Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

2/ All costs and returns are shown in constant 1978 dollars.

3/ The 1978 base year figure has been adjusted upward in order to include the effect of the revised fire financing policy which calls for full funding of presuppression activities instead of relying on supplemental appropriations. The amount of the adjustment (92.4) is from the 1979 President's Budget.

4/ NFS capital investments are such things as: sale preparation--live volume; TSI/reforestation; range structural improvements; road and trail construction/reconstruction; wildlife and fish habitat improvement; developed recreation site construction; water and soil resource improvements; and fuel treatments.

5/ Backlog costs are shown here for information only and are included in capital investment costs.

6/ Total appropriated costs are the sum of operational and capital investment costs. NFS appropriated funds include all YCC and Cooperator Funds.

7/ NFS allocated costs include YACC and other human resource programs, O&C Grants, Land and Water Conservation, and other funds. Costs exclude payments to States and Counties, and Federal Highway Funds.

Abbreviations used: AUM = animal unit month; RVD = recreation visitor day

Table 1.2.--Total element costs 1/ for the High and Low Bounds
of the National Forest System Program

Element	Element costs 2/				
	1981	1985		1991-2000	
		High	Low	High	Low
-Million Dollars-					
Recreation	151.9 <u>3/</u>	215.2	110.9	265.7	187.2
Wilderness	13.6	28.3	13.5	36.8	28.7
Wildlife & Fish	36.7	77.9	28.4	79.4	49.9
Range	38.6	49.6	33.5	48.1	48.1
Timber	888.9	915.0	839.9	940.1	946.3
Water	19.6	32.8	15.5	32.9	26.4
Minerals	17.7	34.7	24.0	47.6	32.2
Human & Community Development	170.6	291.3	231.3	60.0	0
Protection	161.0	184.7	154.5	233.4	188.1
Lands	63.3	258.4	215.9	170.4	104.5
Soil	11.3	30.3	15.1	33.1	18.5
Facilities	93.0	240.8	145.4	352.0	221.6
Total appropriated	1472	1970	1438	2295	1847
Total allocated	194	389	389	5	5
Total National Forest System	1666	2359	1827	2300	1852

1/ All costs are in constant 1978 dollars

2/ Includes both appropriated and allocated costs for all activities and outputs of each element, including the key activities and output shown in Table 1.1.

3/ 1981 Recreation element costs include Land and Water Conservation Fund (L&WCF). Beyond 1981, L&WCF are included in the Lands element.

the 1979 RPA Assessment, 7/ where the principles and findings described were used in developing and evaluating the Program for the National Forest System, State and Private Forestry and Research programs.

State and Private Forestry

The 1979 Assessment points out that the most critical demand for the foreseeable future is for softwood sawtimber. The National Forests can meet only a part of the increased demand and harvests from forest industry lands, particularly in the Northwest, are projected to decline for several years. Therefore, any significant increase in domestic softwood supply must come from non-industrial private forest lands, primarily those in the South.

The inventory of southern pine has increased over the last 25 years. Much of this build-up has come from pre-1965 natural regeneration of abandoned agricultural lands and from planting under the "Soil Bank" or Conservation Reserve Program. However, the Assessment makes it clear that as the softwood harvest from nonindustrial private forest land increases in the next several decades, much greater attention must be paid to regenerating pine following harvest.

Wood production will be a major thrust of the State and Private Forestry program, but financial and technical assistance will continue to support a wide variety of multipurpose protection and management activities geared to the objectives of the landowners. Forest industry and consulting foresters also will continue to assist and to encourage these landowners to invest in improved forest management.

Both the Low and High Bounds of the State and Private Forestry program reflect an emphasis on improved forest management and planning to increase production of renewable resources on non-Federal lands. Activities at both Bounds increase over the duration of the planning period in response to increased demands projected by the Assessment, and to public opinion. The High Bound responds more rapidly. The most distinct difference between the two Bounds is that at the Low Bound the two protection programs--rural fire prevention, and control and insect and disease control--remain at the 1981 level through 1985 before increasing and then leveling off by 1995. At the High Bound these programs would begin to rise immediately and level off in 1985. The level of Federal financial assistance in the Low Bound would shift more financial responsibility to the States for providing protection on non-Federal lands, especially for rural fire prevention and control.

Goals.--The following major Program goals will guide implementation of the Program for State and Private Forestry (more specific resource and support element goals and objectives appear in part II of this chapter):

- Promote cooperative planning and technical assistance that emphasizes nonincome-producing outdoor recreation on other public and private lands.
- Provide technical assistance for increased wildlife and fish habitat of forested lands, with emphasis on endangered and threatened species.

7/ 1979 RPA Assessment, p. 508-516.

- Provide technical assistance on non-Federal forested ranges in co-operation with other agencies.
- Provide technical assistance to support a major expansion of private timber supply and to support application of improved management practices.
- Stimulate major improvements for use of wood fiber.
- Provide forest protection assistance and direction to help meet output goals.
- Provide assistance for protection and improvement of soil fertility, and for water quality and yield in cooperation with other agencies.
- Provide technical assistance for mineral resource planning and for reclamation of disturbed lands.
- Promote coordinated management of all forest lands through State forest resource planning.
- Provide technical expertise and guidance to State forestry agencies for urban and community forestry.

Outputs, activities, and costs.--The key outputs and activities for State and Private Forestry are displayed in table 1.3. Fiscal year 1978 is a base for comparison, and projections are made for the period 1981-2030. Operational and capital investment costs are presented for the same time periods. Both the High and Low Bound are presented for all categories. These encompass a range of options in order to identify desirable resource goals and, at the same time, reflect fiscal uncertainty and changing national needs.

The proportion of the Program costs for State and Private Forestry that are associated with each of the 12 Program elements are depicted in table 1.4.

State and Private Forestry programs are most strongly associated with timber production and resource protection; comparatively little assistance is provided for recreation, wildlife, range, minerals, soil, and water. It is important to keep in mind, however, that these latter elements must figure prominently in the concept of multiresource planning and management and in protection of all forest resources from fire, insects, disease, and careless timber management and harvesting activities.

The U.S. Department of Agriculture's Farmers Home Administration, Soil Conservation Service, Agricultural Stabilization and Conservation Service, and Science and Education Administration-Extension also play significant roles related to timber management and utilization. The Science and Education Administration provides educational services to landowners, loggers, and processors through its extension foresters. The Soil Conservation Service provides assistance to landowners in the development of overall soil and water conservation plans for their property, in the determination of appropriate land uses, and in the application of soil and water conservation practices. The Farmers Home Administration administers a loan program that includes credit for timber operations. The Agricultural Stabilization and Conservation Service makes cost-share payments under the Agricultural Conservation Program and

Table 1.3.--Projected State and Private Forestry Program outputs, activities,
and costs 1/

--Recommended Program

Program element and activity	Unit of measure	Base Year 1978	Range	1981	Annual units								
					1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2020
RECREATION													
Cooperative Tech. Assistance for Dispersed Rec.	Thousand acres	81	High Low	109	157 156	206 168	254 181	304 196	355 216	476 237	556 243	622 245	645 251
WILDLIFE & FISH													
Cooperative Tech. Assistance for Wildlife Habitat Improvement	Thousand acres	170	High Low	117	376 373	633 437	891 508	1151 586	1277 600	1575 614	1644 635	1704 626	1750 636
RANGE													
Cooperative Tech. Assistance for Range Improvement	Thousand acres	50	High Low	65	114 113	162 126	211 139	259 152	304 171	410 190	444 219	482 218	511 224
TIMBER													
Reforestation (RFA, FIP, ACP)	Thousand acres	326	High Low	545	926 921	1019 967	1120 1023	1219 1079	1245 1113	1303 1149	1439 1263	1571 1376	1677 1468
Timber Stand Improvement (RFA, FIP, ACP)	Thousand acres	275	High Low	375	614 612	660 640	699 661	742 687	828 815	1209 943	1209 1086	1360 1207	1492 1247
Timber Prepared for Harvest	Million cubic feet (MMCF)	225	High Low	237	274 271	312 280	348 290	386 302	444 321	544 340	609 346	670 346	717 350
Woodland Owners Assisted	Thousand Owners	165	High Low	187	219 217	246 232	273 248	300 266	317 278	362 290	459 353	504 351	540 381
Improved Utilization of Wood	Million Cubic feet (MMCF)	164	High Low	134	159 157	184 164	209 170	234 178	245 205	267 232	281 244	305 261	325 277
PROTECTION													
Insect & Disease Management Surveys	Million acres	600	High Low	461	493 461	551 461	589 461	635 461	645 588	669 635	694 635	694 635	694 635
Rural Community Fire Protection	Thousand approved applications	3	High Low	--	4.1 4.1	4.1 4.1	4.2 4.2	4.2 4.2	4.3 4.3	4.1 4.1	4.2 4.2	4.3 4.3	4.4 4.4
Fire Loss on Protected Area	Thousand acres burned	1700 ^{1/}	High Low	2400	2100 2400	2000 2400	1900 2400	1750 2400	1750 1950	1750 1750	1750 1750	1750 1750	1750 1750
WATER, MINERALS, LANDS, AND SOILS													
State Forest Resource Planning	Million acres	--	High Low	138	138 138	150 140	157 142	164 138	182 134	188 142	187 143	190 142	190 142
Cooperative Tech. Assistance for Landowner Forest Management Plans	Million acres	3.2	High Low	3.0	3.6 3.6	4.2 3.8	4.7 3.9	5.2 4.0	5.4 4.4	5.9 4.8	7.6 5.0	8.9 5.1	9.9 5.2
Cooperative Tech. Assistance	Person years	--	High Low	20	33 33	46 36	58 39	71 43	74 48	71 53	68 52	67 52	65 52
WORKFORCE													
	Thousand staff years	1.0	High Low	0.8	1.4 1.2	1.4 1.2	1.5 1.2	1.6 1.2	1.6 1.4	1.7 1.5	1.7 1.6	1.7 1.5	1.7 1.6
COSTS STATE AND PRIVATE FORESTRY													
Operational	Million dollars ^{2/}	30	High Low	23	32 25	35 26	39 27	43 27	44 34	45 38	46 40	47 39	48 40
Capital Investments ^{3/}	Million dollars	50	High Low	38	52 42	58 42	63 43	69 44	71 56	74 62	75 65	76 64	78 65
Total Appropriated ^{4/}	Million dollars	80	High Low	61	84 67	93 68	102 70	112 71	115 90	119 100	121 105	123 103	126 105
Allocated ^{5/}	Million dollars	37	High Low	28	54 54	58 58	61 61	65 65	69 69	73 73	73 73	73 73	73 73
Total S&PF	Million dollars	117	High Low	89	138 121	151 126	163 131	177 136	184 159	192 173	194 178	196 176	199 178

1/ S&PF-Cooperative Fire Loss base figure is calendar year 1977.

2/ All costs are shown in constant 1978 dollars.

3/ S&PF capital investments include such activities as: reforestation; timber stand improvement; preparation of landowner forest management plans; cooperative forest resource planning; insect and disease surveys; and fire management planning and fuel treatment.

4/ Projected estimates of funds appropriated to the Forest Service for cooperative forestry assistance under P.L. 95-313.

5/ Projected estimates of funds appropriated to other USDA agencies for programs which receive assistance from the Forest Service and State forestry agencies, including (1) forestry practices under the Agriculture Conservation Program and the Forestry Incentives Program funded through the Agricultural Stabilization and Conservation Service; (2) Rural community fire protection funded through the Farmers Home Administration; and (3) funds allocated to the Forest Service by the Soil Conservation Service for the forestry aspects of watershed planning, flood prevention, river basin surveys and investigations, and resource conservation and development.

Table 1.4.--Total element costs 1/ for the High and Low Bounds of the State and Private Forestry Program

Element	Element costs 2/				
	1981	1985		1991-2000	
		High	Low	High	Low
-Million Dollars-					
Recreation	0.2	0.5	0.4	0.9	0.6
Wildlife & Fish	0.6	3.2	2.4	4.2	2.8
Range	0.1	0.3	0.2	0.5	0.3
Timber	34.9	74.7	68.1	89.7	78.2
Water	11.2	12.8	12.6	9.2	9.0
Minerals	0.1	0.5	0.4	0.6	0.4
Human & Community Development	1.5	2.1	1.5	1.5	1.5
Protection	33.8	73.1	42.5	72.5	72.5
Lands	6.4	9.7	7.6	12.8	7.8
Soil	---	0.1	0.1	0.1	0.1
Total appropriated	61	112	71	119	100
Total allocated	28	65	65	73	73
Total S&PF	89	177	136	192	173

1/ All costs are in constant 1978 dollars

2/ Includes both appropriated and allocated costs for all activities and outputs of each element, including the key activities and outputs shown in table 1.3.

the Forestry Incentives Program, and the Forest Service cooperates with State forestry agencies to deliver these two incentives programs to landowners.

Research

While the Forest Service currently devotes approximately 1,000 scientist-years to research, it is not the sole source of research for forests and associated rangelands. Of the more than 1,600 publically supported scientist-years

now devoted to such work, about 600 are contributed by State Agricultural Experiment Stations and the 61 forestry schools. Additional forestry research is done in private universities and by industry.

Public efforts are jointly planned through a system of regional and national planning sponsored by the U.S. Department of Agriculture (USDA). In 1978, following a series of user conferences, comprehensive plans were developed for Regional and National Programs of Research for Forests and Associated Rangelands. 8/ The plans were consolidated into 23 broad research initiatives and incorporated in the development of the 1980 Program update for Forest Service Research (table 1.5). These plans will be updated soon to reflect changes in the Forest Service effort. 9/

At the High Bound of the Program, all of these research initiatives to provide new technology for resource management and utilization would be implemented by 1985. At the Low Bound, implementation would proceed more slowly (table 1.5).

Expanded research would help extend the Nation's timber supply through development of better management and utilization practices. It would provide the scientific basis for programs in other forest resources such as range, arid lands, and wildlife. It also would develop methods for improving protection, land management planning, and air and water pollution abatement.

Basic research would be increased to provide background knowledge to improve technology and productivity for future natural resource management. Research programs, including efforts with cooperating universities and agencies and competitive grants, will be designed to solve problems related to both public and private forests and rangelands.

Goals.--The following major goals will guide implementation of the Program for Research (more specific resource and support element goals and objectives appear in part II of this chapter):

- Provide natural resource managers with improved technology that will allow them to increase opportunities for high quality recreational

8/ U.S. Department of Agriculture and National Association of State Universities and Land Grant Colleges. National program of research for forests and associated rangelands. August 1978.

Program of research for forests and associated rangelands; western region. August 1978.

Program of research for forests and associated rangelands; north central region. August 1978.

Program of research for forests and associated rangelands; north-eastern region. August 1978.

Program of research for forests and associated rangelands; southern region. August 1978.

9/ The Research programs described briefly in this document will be explained in detail in a separate publication at a later date.

Table 1.5.--Research initiatives in the 1980 RPA Program

Initiative <u>1/</u>	1981	1985		1995	
		Low	High	Low	High
Eastern hardwoods <u>2/</u>	X	X	X	X	X
Softwood Utilization and Management <u>2/</u>	X	X	X	X	X
Rangeland Research	X	X	X	X	X
Disturbed Area Rehabilitation	X	X	X	X	X
Integrated Pest Management	X	X	X	X	X
Research Construction	X	X	X	X	X
Air Quality/Acid Rain		X	X	X	X
Anadromous Fish		X	X	X	X
Basic Research		X	X	X	X
International Forestry		X	X	X	X
Nonpoint Source Pollution		X	X	X	X
Recreation Research		X	X	X	X
Accelerated Pest Management			X	X	X
Endangered and Threatened Species			X	X	X
Harvesting Systems			X	X	X
Land Management Planning			X	X	X
Multiresource Evaluation			X	X	X
Products Utilization			X	X	X
Riparian Habitat			X	X	X
Silviculture and Genetics			X	X	X
Snow Management			X	X	X
Urban and Community Forestry			X	X	X
Wildlife Habitat Management			X	X	X

1/ These initiatives strengthen ongoing research or provide new research direction in response to regional and national planning and the RPA Assessment.

2/ Include wood biomass for energy.

experiences, while minimizing biological and physical impacts on the resource and other uses.

- Provide management knowledge to sustain high quality wilderness environments while allowing appropriate uses.
- Develop the scientific knowledge for the maintenance and improvement of wildlife and fish habitats on forest and rangelands.
- Provide rangeland managers with technology to increase livestock and forage production and maintain other range resource benefits.
- Develop appropriate knowledge and technology to guide and support intensification of timber management on all commercial forest lands.

- Emphasize research on wood as an energy source and on inventorying the biomass to determine its composition. Continue development of complete tree utilization and other technology to increase softwood supplies, improvement of structural designs that use timber as the basic material, and development of high value products from low-grade hardwoods.
- Develop technology related to problems of harvesting and transporting, biomass for energy, and new fiber and solid wood products.
- Develop scientific knowledge necessary to improve and predict the quality, quantity, and timing of water yield from forest and range land watersheds.
- Develop scientific knowledge necessary to minimize environmental impacts of mineral activities and restore disturbed lands to full productivity.
- Provide scientific knowledge that can assist resource managers to increase the benefits (cleaner air, visual enhancement, vegetative diversity, property values, soil stability, water quality, etc.) that urban forest and associated resources contribute to the well-being of urban residents.
- Provide technology for reducing adverse impacts of diseases and insects on growing trees as well as timber in use.
- Provide technology to reduce the cost of fires by improving fire behavior prediction and fuel treatment; provide knowledge of the effects of fire on forest and range ecosystems.

Costs.--Table 1.6 displays the operational and capital investment costs for Research. Fiscal year 1978 is a base for comparison, and projections are made for the period 1981-2030. Both the High and Low Bound are presented. These encompass a range of options in order to identify desirable resource goals and, at the same time, accommodate uncertainty and changing national needs.

Table 1.6.--Projected Research Costs 1/ Recommended Program

Program Element	Units of Measure	Base year 1978	Range	Annual Units									
				1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
COSTS													
Operational	Million dollars	105.8	High Low	108	139 113	156 118	173 123	190 129	230 143	269 151	285 159	301 164	316 168
Capital Investments	Million dollars	2.7	High Low	3	5 4	7 4	9 5	12 6	8 6	6 4	4 3	4 3	4 3
Total Appropriated	Million dollars	108.5	High Low	111	144 117	163 122	182 128	202 135	238 149	275 155	289 162	305 167	320 171
WORKFORCE													
	Thousand staff years	3.1	High Low	3.5	4.3 3.5	4.7 3.5	5.1 3.6	5.4 3.6	6.4 4.0	7.4 4.2	7.7 4.3	8.2 4.5	8.6 4.6

1/ All costs are shown in constant 1978 dollars.

Human Resource Programs

Human resource programs provide employment, skills training, experience, and education for both young and old persons in a natural resource environment. These programs foster the Secretary of Agriculture's commitment and the Agency's mission to serve the unemployed, underemployed, minorities, economically disadvantaged, youth, and elderly through forestry activities. The programs also contribute substantially to the improvement of facilities and management of public forest and rangelands. Human resource program costs are included in figure 1.4 and are not identified separately.

These programs include the Youth Conservation Corps jointly administered by the U.S. Departments of Agriculture and Interior; the Job Corps Civilian Conservation Centers and the Senior Community Service Employment Program administered by the Forest Service under an agreement with the Department of Labor; and the Young Adult Conservation Corps jointly administered by the U.S. Departments of Agriculture and Interior under agreement with the U.S. Department of Labor. In addition to their primary employment and training benefits, these programs will continue to provide supplementary work force and supplies that help to further Forest Service Research, State and Private Forestry, and National Forest System programs.

In addition to the programs providing compensation, the Forest Service will continue to conduct the Volunteers in the National Forests program that provides opportunities for persons to contribute their talents and knowledge to enhance Forest Service activities. The Forest Service also will serve as a host agency for cooperative programs administered by State and local governments.

At the High Bound, the Forest Service would continue employment and training programs for youth, older Americans, and the disadvantaged in response to national employment and training needs and the opportunities existing in the forestry area. At the Low Bound, the Youth Conservation Corps program would be terminated after 1983. The other programs would be retained.

The possibility of extending the benefits of human resource programs to private as well as public lands--perhaps in lieu of cost-sharing for reforestation and timber stand improvement--will be explored, and a recommendation concerning the authority needed will be forwarded to the President.

Total Forest Service Program Costs

Total projected Program costs for the High and Low Bounds of the 1980 Forest Service Program are shown in figures 1.1 and 1.2. Only appropriated funds are shown in these figures. The projected budget requirements of the Program for selected future years are shown in table 1.7 in the current Forest Service budget format. As in earlier tables, costs and budget requirements are shown in 1978 constant dollars. Annual budget preparation must be responsive to short-range planning that includes consideration of short-term needs, constraints, and priorities. The 1980 RPA Program defines the long-range goals and directions that will generally guide development of annual budget requests.

Figure 1.1

COSTS - RECOMMENDED PROGRAM - HIGH BOUND

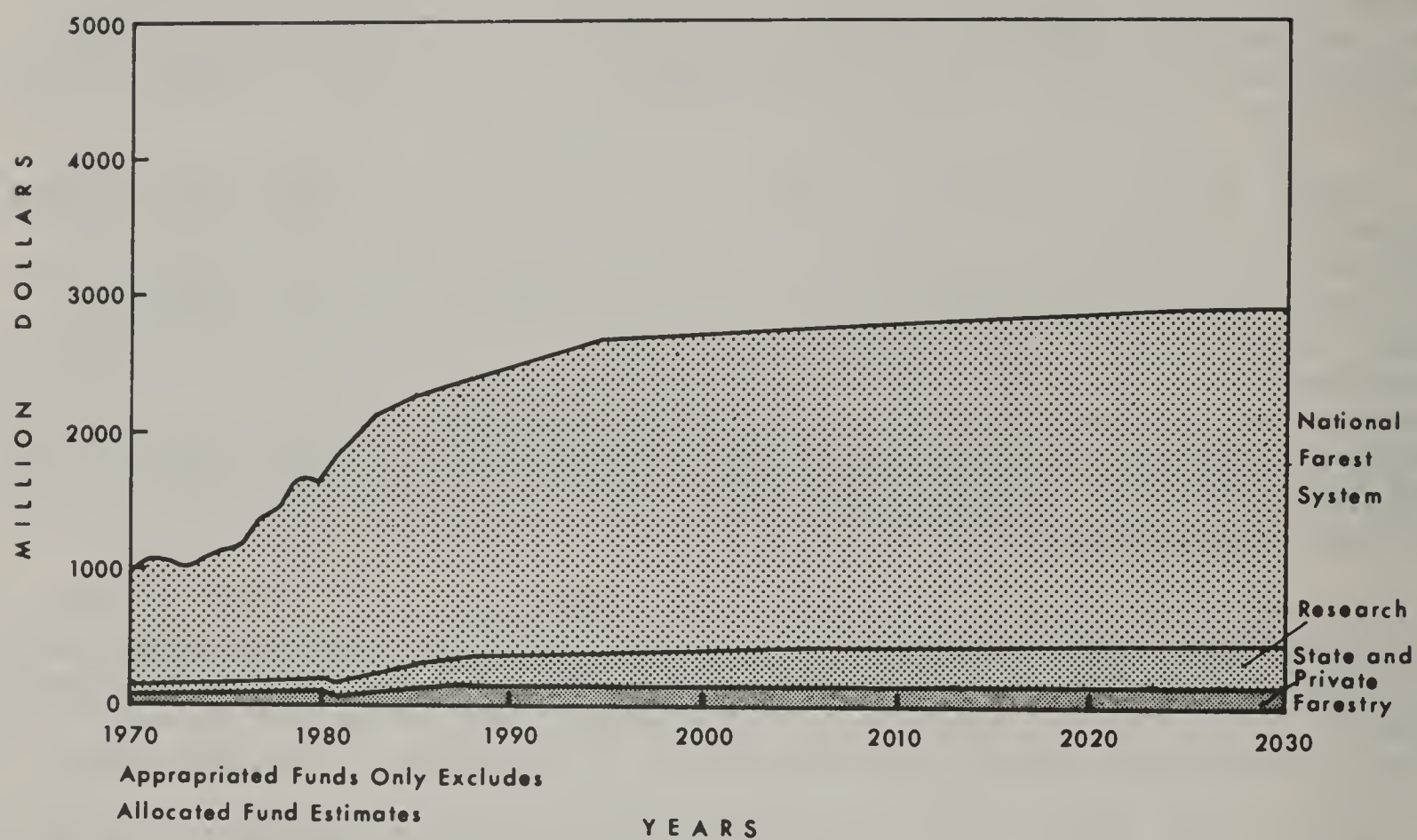
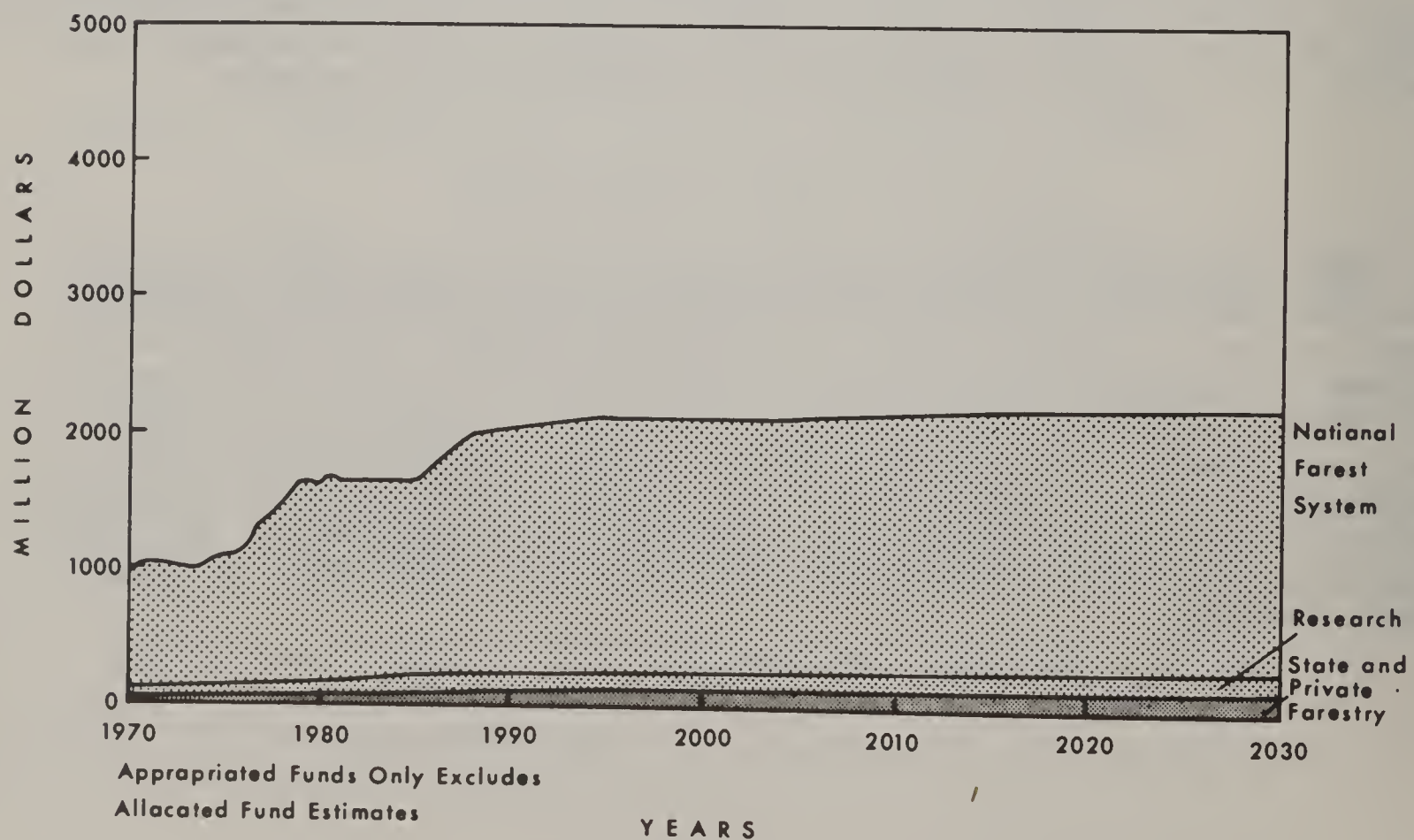


Figure 1.2

COSTS - RECOMMENDED PROGRAM - LOW BOUND



**Table 1.7.--Projected Forest Service budget requests
based on the Recommended Program**

Forest Management Protection and Utilization	1980 Budget Authority	Range	Recommended Program		
			1981	1985	1995
FOREST RESEARCH					
Land and Resource Protection Research	49.431	High Low	50	82 56	116 65
Renewable Resource Management and Utilization Research	55.627	High Low	58	108 73	153 86
Total Forest Research	105.058	High Low	108	190 129	269 151
STATE AND PRIVATE FORESTRY					
Cooperative Land and Resource Protection	42.235	High Low	34	63 34	63 63
Cooperative Renewable Resource Management and Utilization	20.389	High Low	24	44 34	56 37
General Forestry Assistance	9.163	High Low	3	5 3	-- --
Total State & Private Forestry Cooperation	71.787	High Low	61	112 71	119 100
NATIONAL FOREST SYSTEM					
Land and Resource Protection	315.279	High Low	330	448 330	647 439
Renewable Resource Management and Utilization	483.764	High Low	476	602 482	869 634
Total National Forest System	799.043	High Low	806	1050 812	1516 1073
Total Forest Management Protec- tion and Utilization	975.888	High Low	975	1352 1012	1904 1324
Construction and Land Acquisition <u>2/</u>	510.905	High Low	450	687.4 452.9	529.5 597.0
Youth Conservation Corps	54.000	High Low	38	60.0 0	60.0 0
Acquisition of Lands for National Forests--Special Act	0.235	High Low	--	--	--
Acquisition of Lands to Complete Land Exchanges	0.155	High Low	--	--	--
Range Betterment	5.900	High Low	6.9	7.0 6.9	7.0 6.9
Construction and Operation of Recreation Facilities	3.850	High Low	3.9	4.0 3.9	5.3 3.9
Timber Salvage Sales	11.000	High Low	11.5	11.5 11.5	11.5 11.5
Brush Disposal	40.509	High Low	42.5	55.0 42.5	55.0 42.5
Cooperative Work, Other, & KV	56.959	High Low	96.2	96.2 96.2	96.2 96.2
Timber Purchaser Road Construc- tion by Forest Service	15.000	High Low	20.0	20.0 20.0	20.0 20.0
Total Appropriated	1714.491	High Low	1644	2284 1644	2688 2102
Total Allocated	202.489	High Low	222	454 454	78 78
Total Forest Service	1916.980	High Low	1866	2736 2098	2766 2180

1/ All costs are in constant 1978 dollars.

2/ Includes Roads and Trails for States (10% Fund), Research Construction, FA&O, Recreation Use, Forest Roads and Trails, Land Acquisition, and Weeks Act.

Work Force Requirements

The estimated total Forest Service work force required to implement the Recommended Program at the High and Low Bound is summarized in table 1.8. The estimates include seasonal and other part-time employees as well as permanent full-time employees of the National Forest System, State and Private Forestry, and Research programs.

The work force projections for 1981 were based on the average number of person years (PY's) per million dollars of actual budget (in constant 1978 dollars) for the most recent 5-year period. For the National Forest System this is calculated to be 28.9 PY's per million dollars; State and Private Forestry and Research requirements are calculated to be 10.3 and 31.3 PY's per million dollars, respectively.

Projections for future years in State and Private Forestry and Research programs assume productivity increases to be achieved in part by increasing the amount of cooperative extramural and grant-type program activities in addition to increasing in-house work force. State and Private Forestry work force requirements would decrease to 8.8 PY's per million dollars and Research to 26.8 by 1985, and then stay constant through the remainder of the planning period.

Projections for National Forest System work force requirements assume that productivity increases will be achieved through implementation of new technology from research, and improved management effectiveness from new planning processes. However, these increases are assumed to be offset by increased environmental and managerial standards brought about by new laws, regulations, and results of litigation. Therefore the relationship between PY's and dollars remains constant over the planning period. Both Bounds of the Program anticipate expansion in the use of private contractors, whenever doing so is advantageous to the Government.

Table 1.8.--Forest Service work force in 1978 with projections to 2025 under the Recommended Program ^{1/}

Year	Thousand person-years		Year	Thousand person-years	
	Low	High		Low	High
1978		44.4	1988	60.9	77.4
1981		56.8	1995	59.2	75.6
1982	57.9	68.4	2005	60.3	77.2
1983	57.9	70.9	2015	61.3	79.4
1984	57.7	72.9	2025	60.8	80.8
1985	57.6	75.2			

^{1/} Does not include Human Resource Program enrollees or volunteers.

Environmental Effects

The environmental effects of implementing the Program are described as changes in the economic, physical-biological, and social components of the environment compared with the conditions associated with the present program. The changes are a direct result of the shift in levels of outputs shown in tables 1.1, 1.3, and 1.6.

Economic Effects

Overall, the Program would yield high returns. "Present net worth" of the National Forest System program--total benefits minus costs, discounted at 7 1/8 percent--would be \$48.9 billion at the High Bound and \$47.5 billion at the Low. Returns to the Government for sale or lease of National Forest System resources would increase more than 6 percent per year at the High Bound, and 4 percent per year at the Low Bound through the planning period. For the next 2 to 5 years, National Forest System programs would be generally operating at a small net loss, but thereafter returns to the Government would exceed costs. For instance, by 1995, returns would rise to between \$2.9 and \$3.1 billion per year while costs would edge up to between \$1.9 and \$2.3 billion, leaving a balance of nearly \$0.8 to \$1.0 billion.

Other economic benefits from the National Forest System are also impressive. Cash returns to county governments would increase to over \$508 million per year by 1985 under the High Bound and \$448 million under the Low. At the same time, annual employment directly or indirectly supported by Forest Service programs would increase by 1/2 million person-years at the High Bound, and 1/4 million person-years at the Low Bound.

For the State and Private Forestry program, the 1979 RPA Assessment identified many opportunities for improved forest management on nonindustrial private lands that would yield a positive present net worth. Part of these opportunities would be implemented through cost-sharing programs such as the Forestry Incentives Program, through technical assistance for timber management, and through improved utilization. This would help decrease future imports and softwood lumber and plywood prices.

The Research portions of the Program would also be expected to yield positive returns. Future benefits of research are uncertain and cannot be anticipated precisely. However, an examination of returns to past research investments in selected Forest Service innovations has shown that monetary and other benefits substantially exceeded research costs. All available data indicate that funding increases specified in the Program would lead to high returns in relation to the additional dollars invested in research.

Physical-Biological Effects

The Program would meet or exceed national ambient air quality standards from National Forest System lands. The High Bound program would meet water quality goals by 2000 and would provide increases in water yield and soil productivity. The Low Bound program is a continuation of the current levels of inventory, monitoring, and improvement and would meet water quality goals by 2000 if the increased level of commodity production does not require a shift

in emphasis from the improvement program to a more intensive data collection program. Water yield and soil outputs would be maintained at present levels.

At the High Bound, wildlife habitat would be improved, with special emphasis on endangered and threatened species. There would be significant improvement in anadromous and resident fish habitats. Habitat would be managed to maintain diverse populations of all wildlife and fish species. At the Low Bound, habitat for most wildlife and fish species would decline slightly although anadromous fish populations would increase slightly. Habitat diversity would be maintained.

Visual quality would improve through actions to better mitigate short-term visual impacts. Cultural resource identification and protection needs would be provided for as activities and use increase. Extensive mitigation actions and conflict resolution would be accomplished.

Specific physical-biological effects include:

- Wildlife and fish species are generally favored at the High Bound. In 28 out of 39 cases, populations of endangered and threatened plants and animals would increase by 1995; the remaining 11 cases would remain stable. At the Low Bound, all of the endangered and threatened species would remain stable, except five plant species whose populations would decline.
- Among the 68 populations of indicator species, 39 would increase, 19 would remain stable, and 10 would decrease by 1995 at the High Bound. At the Low Bound, six of the populations would increase, 12 would remain stable, and 50 would decrease by 1995.
- Significant activities in mineral permits and leases would lead to visual impacts that cannot be fully mitigated by Forest Service management; timber production would cause moderate short-term impacts on color and texture of the forest landscapes.

Social Effects

For the most part, the Program is seen as having socially beneficial effects in all regions. This influence is greatest in the West for National Forest System programs and in the East for the State and Private Forestry programs. Negative impacts would tend to be localized and related to some accelerated mineral development. While there would continue to be some crowded recreation areas, the impacts would be very site-specific.

Social impacts in counties undergoing intensive timber harvest, especially those with a single economic base, would tend to be mixed. When harvesting increases moderately, employment opportunities and community income would increase with the results of a stronger tax base for education and government services, and decreased migration of younger workers. Long-term decreases in harvest might have large negative economic impacts and lead to a loss of community viability.

In communities where timber harvesting from nonpublic lands would decline during the next 20 years, an increase from National Forests would soften the negative economic impacts.

Recreation development impacts might be intense for particular localities. Especially strong social effects would occur in communities that become major centers for particularly large recreational developments, such as ski areas.

The High Bound of the Program would provide for stability in range grazing permits and should help support communities in sparsely populated areas. Minor reductions in animal unit months of grazing (6 percent) at the Low Bound in the first 5 years would be met through normal attrition of permits with little effect nationally, although in the western regions there would be a negative impact especially on marginal family operations dependent on National Forest System rangeland for forage during part of the year.

The wilderness program would increase opportunities for certain types of leisure. However, for the most part, the acreage increases themselves may not have significant social impacts. In some cases the expressed value conflict between commodity-dependent local citizens and regional noncommodity interests might become important political issues.

At the High Bound, the wildlife and fisheries program would significantly increase recreational opportunities and commercial values. The Low Bound would cause a reduction in recreational and commercial values of all species except anadromous fish whose populations would show increases because of special emphasis.

Positive social effects of mineral leasing and exploration include meeting the Nation's needs for energy and other mineral uses as well as reducing inflation. However, some adverse local impacts associated with "boom town" mining developments seems likely.

Departure from Nondeclining Even-Flow

The National Forest Management Act of 1976 (NFMA) requires that plans be prepared for the management of the land and resources of each National Forest. The plans include a determination of timber harvest levels. The NFMA permits, and a subsequent memorandum in June of 1979 from the President, instructed the Secretary of Agriculture, ". . . to use maximum speed in updating land management plans on selected National Forests with the objectives of increasing the harvest of mature timber through departure from the current nondeclining even-flow policy. All relevant economic and environmental implications must be taken into account." ^{10/} The extent of increased harvest possible will be determined for each National Forest in development of the land management plan. The regulations developed pursuant to the Act provide for consideration of departure as an alternative in the National Forest plan when certain conditions are met.

In response to the President's direction, the Forest Service has reordered its priorities for completing individual National Forest plans to concentrate planning efforts on National Forests which have a large inventory of old-growth softwood suitable for home construction. The National Forest System Land and

^{10/} President's memorandum to the Secretary of Agriculture, 6/12/79.

Resource Management Planning regulations 11/ and the Forest Service Manual 12/ provide specific direction in formulating alternatives for the management of all National Forest resources. This process will provide an opportunity to examine a broad range of National Forest production possibilities, associated costs, and environmental effects for all resources. Specific consideration will be given to a range of increases of timber harvests over recent cutting levels in National Forest plans for the first decade of the planning period. This range will generally be wider than that expressed in the Program targets (figure 1.13 and table 1.1).

National Forest plans will also be subject to the requirements of the National Environmental Policy Act of 1969, 13/ which provides an opportunity for public input as National Forest land and resource management plans are developed. Any departure proposed by a Regional Forester is subject to approval by the Chief of the Forest Service.

The initial round of the National Forest planning process is expected to be completed in 1985. Forty National Forests have been identified by the Forest Service where departure may be a viable option. Among these, four National Forests are scheduled to have completed draft plans by December 1980:

Lolo
Sierra

Mt. Hood
Deschutes

Eight National Forests are scheduled to have completed draft plans by December 1981:

Flathead
Kootenai
Six Rivers
Klamath

Shasta-Trinity
Siskiyou
Wallowa-Whitman
Olympic

Four National Forests are scheduled to have completed draft plans by December 1982:

Gifford Pinchot
Rogue River

Mt. Baker-Snoqualmie
Wenatchee

Departure volumes in these and other National Forest plans may provide opportunities in addition to the range of outputs shown in the Program or may constitute a means of reaching established targets. This could be especially applicable where National Forest planning under NFMA regulations results in adjustments to production capability. The plans will be implemented as they are completed. These plans will also be used for adjusting National Forest resource goals during the 1985 RPA update. Additional volumes and costs that may be obtained through departure will be shown in the Annual Evaluation Reports of the RPA Program.

11/ 36 CFR 219.5(f).

12/ FSM 1920.85 (Interim Directive no. 6, 3-10-80).

13/ 83 Stat. 852 as amended; 42 U.S.C. 4321 et seq.

Opportunities for Owners of Private Forests

The 1979 Assessment shows that there are numerous opportunities for investments in timber management that would yield positive returns on nonindustrial and industrial private forest lands. If these investments were made, timber supplies could be increased substantially. There are economic opportunities for more intensive management on 168 million acres of commercial timberland, about one-third of the Nation's total. All but about 10 million of these acres are in private ownership. With treatment of these acres, net annual timber growth could be increased by 12.7 billion cubic feet, a volume roughly equal to three-fifths of the total net annual growth in 1976. The bulk of opportunities are for softwoods. Full benefits from the treatments would appear several decades after the investments were made. Furthermore, substantial capital, a total of \$13.3 billion over a 10- to 15-year period, would be required to do the job on all identified acres.

About three-quarters of the area contain economic opportunities for reforestation or conversion of existing stands. This category includes regeneration of nonstocked acres, harvesting mature stands and regenerating the harvested areas, and conversion of existing stands to more desired species. Reforestation and conversion efforts would require 88 percent of total expenditures for all treatments; and 90 percent of the increases in timber supply would come from these acres.

Seventy-four percent of the opportunities for treatment and investment are on nonindustrial private ownerships that collectively contain about 58 percent of the commercial timberland in the Nation. A \$10 billion investment in these ownerships over a 10- to 15-year period would earn financial returns greater than 4 percent and would boost net annual growth by over 9 billion cubic feet for the next 30 to 50 years. Most of the remaining opportunities are on the 14 percent of commercial timberland in forest industry ownerships. Table 1.9 presents the economic opportunities by region, treatment, and ownership.

Basic Resource Protection

The Forest and Rangeland Renewable Resources Planning Act, as amended, requires that the Program recognize the need to protect and, where appropriate, improve the quality of soil, water, and air resources. ^{14/} Emphasis was placed on this requirement from the very beginning of the program development process. Supporting this protection of the basic resources is the Forest Service law enforcement program which is designed to assure that public use of the National Forest complies with Federal laws and regulations.

The following paragraphs briefly describe the provisions of the Program for basic soil, water, and air resources.

Soil

National Forest System.--Support services are provided for maintaining soil productivity and to prevent degradation of soils due to other resource

^{14/} The soil, water and air resources mentioned here are not the same as the soil and water elements of the Program.

Table 1.9.--Economic opportunities for management intensification on private lands in the United States which would yield 4 percent or more on the investment in constant dollars by region, treatment opportunity, and ownership

Region and treatment opportunity	Forest industry			Nonindustrial private		
	Total	Total cost of treatment	Annual growth increment	Total	Total cost of treatment	Annual growth increment
	Acres	Dollars	Cubic feet	Acres	Dollars	Cubic feet
			(Million)			
Northeast:						
reforestation/	--	--	--	0.2	10.4	8.1
conversion						
stocking control	3.0	233.3	116.9	12.1	449.6	265.4
Total	3.0	233.3	116.9	12.3	460.0	273.5
North Central:						
reforestation/						
conversion	0.7	76.7	55.7	12.1	1195.0	674.4
stocking control	0.3	2.3	11.9	3.4	61.0	174.2
Total	1.0	79.0	67.6	15.5	1256.0	848.6
Southeast:						
reforestation/						
conversion	7.4	570.6	592.3	42.8	3572.6	3664.8
stocking control	0.3	7.6	13.0	0.2	5.4	9.2
Total	7.7	578.2	605.3	43.0	3578.0	3674.0
South Central:						
reforestation/						
conversion	9.8	935.5	886.6	33.2	3253.8	3280.2
stocking control	6.3	158.1	136.9	12.8	338.7	289.8
Total	16.1	1093.6	1023.5	46.0	3592.5	3570.0
Rocky Mountain:						
reforestation/						
conversion	--	4.4	0.8	0.1	15.3	3.1
stocking control	--	0.5	0.4	0.1	1.9	1.6
Total	--	4.9	1.2	0.2	17.2	4.7
Pacific Northwest:						
reforestation/						
conversion	2.5	417.3	511.7	1.6	267.1	317.0
stocking control	1.6	84.3	64.9	0.5	21.4	18.0
Total	4.1	501.6	576.6	2.1	288.5	335.0
Pacific Southwest:						
reforestation/						
conversion	1.5	202.3	283.8	2.4	355.9	325.3
stocking control	0.9	27.1	28.4	2.5	49.0	60.2
Total	2.4	229.4	312.2	4.9	404.9	385.5
Contiguous States:						
reforestation/						
conversion	21.9	2206.8	2330.9	92.4	8670.1	8272.9
stocking control	12.4	513.2	372.4	31.6	927.0	818.4
Total	34.3	2720.0	2703.3	124.0	9597.1	9091.3

activities. This support is provided at a level commensurate with the individual resource programs. In addition, the Program provides for selectively enhancing productivity, for completing soil inventories and monitoring Program activity effects.

State and Private Forestry.--Technical assistance and training will be provided in soil data interpretation, along with cooperative technical assistance specifically for prime forest land mapping in high-priority areas, particularly in the East.

Research.--The Program provides for research to develop scientific knowledge necessary to maintain and protect soil productivity and prevent regression of watershed conditions. Increases in soil research will emphasize rehabilitation of surface-mined land. Other initiatives will include research to determine the soil requirements of recreation sites and wildlife habitats. Soil properties limiting timber and forage production will be evaluated and techniques to improve productivity will be developed.

Water

National Forest System.--In addition to the support activities required in each resource element to prevent degradation of the water resource, water quality improvement is emphasized in the Program. Water resource improvement activities are provided to maintain and selectively improve water quality. Water resource inventories will be made to identify and assess the availability and quality of water. For floodplains and wetlands, natural and beneficial values, protection requirements, and enhancement opportunities will be identified. Water quality monitoring will be carried out to provide a basis for evaluating effectiveness of the Program in meeting water quality goals and for identifying areas and activities where Program adjustments may be needed. All requirements related to water quality, floodplain management and protection of wetlands will be met under procedures established in the Forest Service NEPA and land and resource management planning process.

State and Private Forestry.--The Program provides for technical and financial assistance for protecting and improving the quality, quantity, and timing of water yields from non-Federal forest lands. Assistance will be directed to the highest priority plans and practices to improve water quality, incorporate watershed management principles in forest resources planning, develop best management practices, improve municipal watersheds, improve streamside management, and implement onsite and offsite soil stabilization practices.

Research.--Research will provide the scientific knowledge useful for improving the protection of water resources where watersheds are managed for timber, livestock production, wildlife habitat, or recreation. Increased research activities will determine aquatic and riparian habitat requirements of fish and wildlife, establish guidelines and practices to minimize nonpoint source pollution, and evaluate the effects of acid rain and atmospheric deposition.

Air

National Forest System.--In air quality management, the Program emphasizes protection of air quality related values, including visibility Class I areas,

and managing emissions from National Forest activities to meet national ambient air quality standards.

State and Private Forestry.--Technical assistance will be provided to non-industrial private forest owners for planning and implementing timber harvest operations and associated transportation systems to help reduce resultant dust and exhaust problems. Prescribed burning temporarily decreases local air quality, but it also reduces fuel levels and thus reduces the chance of wildfires. Fire prevention, presuppression, and suppression results in fewer and smaller fires and thus reduces the number and size of areas affected by smoke from wildfires.

Research.--Research will continue to be actively conducted on the generation, transport, and deposition of pollutants, the effects of pollutants on vegetation, soil, water, and wildlife, and on techniques that can reduce the harmful effects of existing pollutants.

Wood Exports and Imports 15/

Exports of softwood logs and lumber under the Program will not substantially vary from those amounts that would be exported under a continuation of present trends. Softwood imports, specifically softwood lumber imports from Canada, would be reduced somewhat.

Softwood lumber imports from Canada have increased from about 3.5 billion board feet, lumber tally, in 1960 to almost 11.8 billion board feet in 1978. The year-to-year fluctuation in Canadian imports is high, however, as Canada acts as the residual supplier to the U.S. softwood lumber market. Import levels have been sensitive to increases in domestic softwood lumber output or reductions in domestic softwood lumber demand. Under the Program, the trend for softwood imports would be a continuing increase for the next three decades, peaking about 2010 at about 11.8 to 14.0 billion board feet and then decreasing rapidly to about 6.8 to 10.0 billion board feet as timber costs in Canada rise relative to those in the United States.

15/ 1979 RPA Assessment, pp. 339-351.

PART II: DESCRIPTION OF THE 1980 RECOMMENDED PROGRAM BY ELEMENT

This part describes the 1980 Recommended Program in more detail. It is organized by the 12 Program elements defined in the Introduction. Within each element, the Program is described in terms of goals, activities, and outputs for the National Forest System, State and Private Forestry, Research, and Human Resource Programs. The goals and objectives reflect policy guidance developed through analysis of the policy issues described in part IV of this chapter. Regional comparisons for selected key activities and outputs are displayed.

Regional and Area Breakdowns

Regional displays of Forest Service outputs and activities are shown for the National Forest System and State and Private Forestry. In the western Forest Service Regions, the National Forest System and State and Private Forestry programs are jointly administered by a Regional Forester. This is true of the Northern (R-1), Rocky Mountain (R-2), Southwestern (R-3), Intermountain (R-4), Pacific Southwest (R-5), Pacific Northwest (R-6), and Alaska (R-10) Regions. In the East and South, State and Private Forestry programs are administered by two Area Directors: one for the Southeastern Area (SA) headquartered in Atlanta, Ga. and one for the Northeastern Area (NA) headquartered in Broomall, Pa. Geographically, SA is the same as the National Forest System Southern Region (R-8) and NA corresponds to the National Forest System Eastern Region (R-9).

As shown in the bar graphs of regional outputs in this chapter, most of the State and Private Forestry activities and outputs occur in the East. This is because there are more States and more private nonindustrial forest lands in the East. Thirty-three of the 50 States are in the East (13 in SA and 20 in NA). Perhaps more important, 90 percent of the private nonindustrial commercial timberland is in the East (48 percent in SA and 42 percent in NA), leaving only 10 percent distributed among the seven western Regions.

Research programs, while administered regionally at Forest and Range Experiment Stations, do not lend themselves to regional displays. Experiment Station boundaries and the many research studies they conduct do not fit National Forest System Regions or any other well defined geographic area. Instead, Station programs of research address an array of studies oriented to local, regional, national, and international problems.

To emphasize the relationship between the 1979 Assessment and the 1980 Program, brief highlights of the Assessment demand-supply projections precede the Program description for the recreation, wilderness, wildlife and fish, range, timber, water, and minerals elements.

Part II describes the Program. Analysis and evaluation of the Program in terms of economic, physical-biological, and social effects are explained in part III.

Assessment

Demand--Demand projections for outdoor recreation indicate substantial growth for all the activities studied--a blended average increase of 61 percent between 1977 and 2030 for land activities, 106 percent for water activities, and 140 percent for snow and ice activities. These projected demand increases are not nearly as large as those experienced in the Sixties. Similarly, projected demand varies by time period (table 1.10).

The sizes of future increases vary considerably by Region and activity. Projected increases are particularly large for land activities in the South and Pacific Southwest, and for snow and ice activities in the North and West. Demands for water activities are more even across all the Regions.

For program review purposes, recreational activities have been grouped into those associated with developed and dispersed recreation. ^{16/} Table 1.11 shows the projected demand by Regions for developed and dispersed recreation. In all Regions, demand for developed recreation is projected to increase more rapidly than for dispersed recreation.

Supply--Nearly all of the Nation's 1.7 billion acres of forest and rangeland and the associated waters are capable of supporting outdoor recreation activities. Currently, only a small portion of that acreage is being intensively managed for recreational purposes. Parks, reservoirs, and developed recreational sites account for a high proportion of use. Opportunities for supplying national demands differ between public and private lands.

Thirty-four percent of the total forest and rangeland acreage is federally owned. These lands, and lands owned by State and local governments, provide a substantial land base for outdoor recreation. Private lands, of course, also provide a large amount of recreational opportunities.

Although Federal units are distributed throughout the United States, over 90 percent of federally owned forest and rangeland is in the western United States, including Alaska, where 19 percent of the U.S. population resides. Seven Federal agencies provided most of the outdoor recreational opportunities on these Federal lands in 1977 (table 1.12).

State and local government lands constitute an important supply of outdoor recreational opportunities. They are largely in the East. Many State parks, forests, and wildlife areas have significant scenic, historical, cultural, and other recreational features. Others provide outdoor recreational opportunities close to metropolitan centers. States reported that their parks had more than 565 million visits in 1975, ^{17/} which represented an increase of 45 percent since 1967.

^{16/} USDA Forest Service, 1979. Estimated recreation demand projections for the 1979 RPA Assessment, 42 p. Unpublished data on file with the USDA Forest Service, Washington office.

^{17/} A visit as used here is not identical to a RVD. It represents a visit of indeterminate length to a recreational site.

Table 1.10.--Indexes by demand for outdoor recreation in the contiguous States by activity group

(1977=100)

Activity group	Base	Projected demand				
	1977	1990	2000	2010	2020	2030
Land: camping, driving, hiking, horseback riding, nature study, picnicking, and sightseeing	100	111	121	135	149	161
Water: canoeing, sailing, other boating, swimming, outdoors, and water skiing	100	118	134	158	181	206
Snow and Ice: skiing, ice skating, sledding, and snowmobiling	100	123	143	175	207	240
Population index 1/	100	112	120	127	134	139

1/ Index of projects increases in population (medium level).

Source: table 3.2, 1979 RPA Assessment.

The 740 million acres of private forest and range in the United States also represent a substantial land base for outdoor recreation, especially in the eastern United States, and more particularly in areas of heavy population concentrations where opportunities for private profit exist. Fifty-three percent of the Nation's 68 million acres of corporate forest and rangelands is in the southeastern and south central regions. Also, an important 19 percent of the corporate land is located in the densely populated Northeast.

Future prospects for increasing the availability of private lands for recreational uses such as campgrounds, ski developments, and marinas are encouraging where returns on investments are satisfactory. However, prospects are not as promising for activities that offer little or no economic return. Currently, about 29 percent of the private noncorporate and 54 percent of the corporate forest and rangelands in the United States are open to the public for some form of recreation--mostly dispersed activities requiring little capital investment, such as hunting, fishing, and hiking. Thus, private lands already provide sizable amounts of dispersed as well as developed recreational opportunities.

Pollution abatement and clean water programs are improving the supply of water based recreational opportunities throughout the United States.

In response to the projected outdoor recreation use demands and in consideration of Forest Service program opportunities that would effectively help meet them, the following Program goals and objectives for recreation resource management, assistance, and research are indicated.

Table 1.11.--Indexes of demand for outdoor recreation in the contiguous States by activity type and Regions with projections to 2030

(1977=100)

Activity type and Regions	Base	Projected demand				
	1977	1990	2000	2010	2020	2030
<u>Developed:</u>						
Northeast	100	119	136	158	181	205
North Central	100	118	133	155	176	199
Southeast	100	116	132	154	176	196
South Central	100	119	140	165	191	213
Rocky Mountain and Great Plains	100	119	135	154	176	195
Northern Rocky Mountains <u>1/</u>	100	114	125	140	151	163
Southern Rocky Mountains <u>2/</u>	100	125	148	175	205	225
Great Plains <u>3/</u>	100	115	127	142	160	174
Pacific Northwest	100	121	140	162	185	206
Pacific Southwest	100	126	150	179	207	230
All Regions	100	119	137	159	183	205
<u>Dispersed:</u>						
Northeast	100	112	123	138	154	170
North Central	100	111	121	136	150	165
Southeast	100	110	119	135	151	165
South Central	100	112	126	145	164	180
Rocky Mountain and Great Plains	100	111	121	134	149	162
Northern Rocky Mountains <u>1/</u>	100	103	108	115	124	132
Southern Rocky Mountains <u>2/</u>	100	116	132	152	172	187
Great Plains <u>3/</u>	100	105	112	121	132	143
Pacific Northwest	100	113	125	140	156	170
Pacific Southwest	100	118	135	156	177	193
All Regions	100	112	123	139	155	171

1/ Northern Rocky Mountains include the States of Montana, Idaho, and Wyoming.

2/ Southern Rocky Mountains include the States of Nevada, Utah, Colorado, Arizona, and New Mexico.

3/ Great Plains States include North Dakota, South Dakota, Nebraska, and Kansas.

Source: Derived from table 3.3, 1979 RPA Assessment. The regional break-down used in this table is illustrated on page 2, 1979 RPA Assessment and is described in the Introduction to this document.

Table 1.12.--Federal recreation area use, 1977

Federal Agency	Number of RVD's 1/ (thousands)	Proportion (percent)
Bureau of Land Management	60,225	10.6
Bureau of Reclamation	33,607	5.9
Corps of Engineers	162,751	28.8
Fish and Wildlife Service	6,010	1.1
Forest Service	204,797	36.1
National Park Service	92,029	16.3
Tennessee Valley Authority	<u>6,980</u>	<u>1.2</u>
Total	566,399	100.0

Source: Table 3.5, 1979 RPA Assessment

1/ RVD (recreation visitor day) consists of 12 visitor hours which may be aggregated continuously, intermittently, or simultaneously by one or more persons.

National Forest System Program

Resource Goals.--Emphasize and facilitate opportunities to know and experience nature; give priority to energy efficiency in public and private sector programs to provide accessibility to all Americans.

Increase use fees to bring them more in line with costs and to reduce public competition with the private sector.

Encourage investment of private risk capital for development of appropriate facilities and services on National Forest System lands.

Provide interpretive and orientation services, and instruction with emphasis on energy conservation and environmental quality.

Enhance and interpret cultural heritage resources. Adjust protection and compliance to the level of recreational use and activities in other resource elements. Complete National Forest cultural heritage resource overviews by 1982 and inventories by 1995.

Program Objectives.--The supply of recreational services in response to rising recreational demand would steadily increase throughout the 50-year planning period under the High Bound. At the Low Bound, full recreational services and facilities for recreational demand would decline below current levels through 1985 and then steadily increase. The expected decrease in recreational use reflects the reduced quantity of services and facilities that would be supplied to support recreation on National Forest System land. However, recreational use of National Forest System land may not be responsive or sensitive to decreases in the level of management and an actual drop in use may not occur. This means that with a reduction in the quantity of

services and facilities, if use does not drop, then the relative quality per RVD would decrease. By 1985, the National Forests are expected to provide services for 22 percent more recreational use at the High Bound and 14 percent less under the Low Bound. By 2030, services for recreational use at the High Bound would nearly double the base year (1978) level of 210 million visitor-days. Services are expected to increase by 50 percent by 2030 under the Low. It is anticipated that the Cooperative Law Enforcement Program would be proposed at a funding level consistent with the actual growth in use of the National Forests where agreements have been made with the State and local law enforcement jurisdictions for protection of the visiting public and their property.

Developed recreation (picnicking, camping, swimming, downhill skiing) would also grow, with the Rocky Mountain Region and California showing the largest growth (figure 1.3). Safe, satisfying opportunities for the public to know and experience nature would be facilitated. Priority would be given to energy efficient and private sector programs to provide better access for urban dwellers and special populations. In providing these opportunities and services, the Forest Service would expand the use of fees where appropriate. Dispersed recreation (backpacking, snowmobiling, hunting, canoeing) would become increasingly important on the National Forests, especially in the East, the Rocky Mountains, and the Far West (figure 1.4). The greatest percentage increase in dispersed recreation is expected in or near the "Sunbelt" States where local population is growing fastest. Trail construction and reconstruction on the National Forests is shown for both Bounds in figure 1.5.

Today's environmental standards will be met in recreational activities and programs, and the level of services will be adequate to protect the visitor's health and safety under both the Low and High Bounds. Under the Low Bound, however, some sites and facilities may be closed and visitor comfort and convenience-oriented services will be reduced through 1985.

State and Private Forestry Program

Resource Goal.--Promote assistance for nonincome-producing outdoor recreation on non-Federal public and private lands.

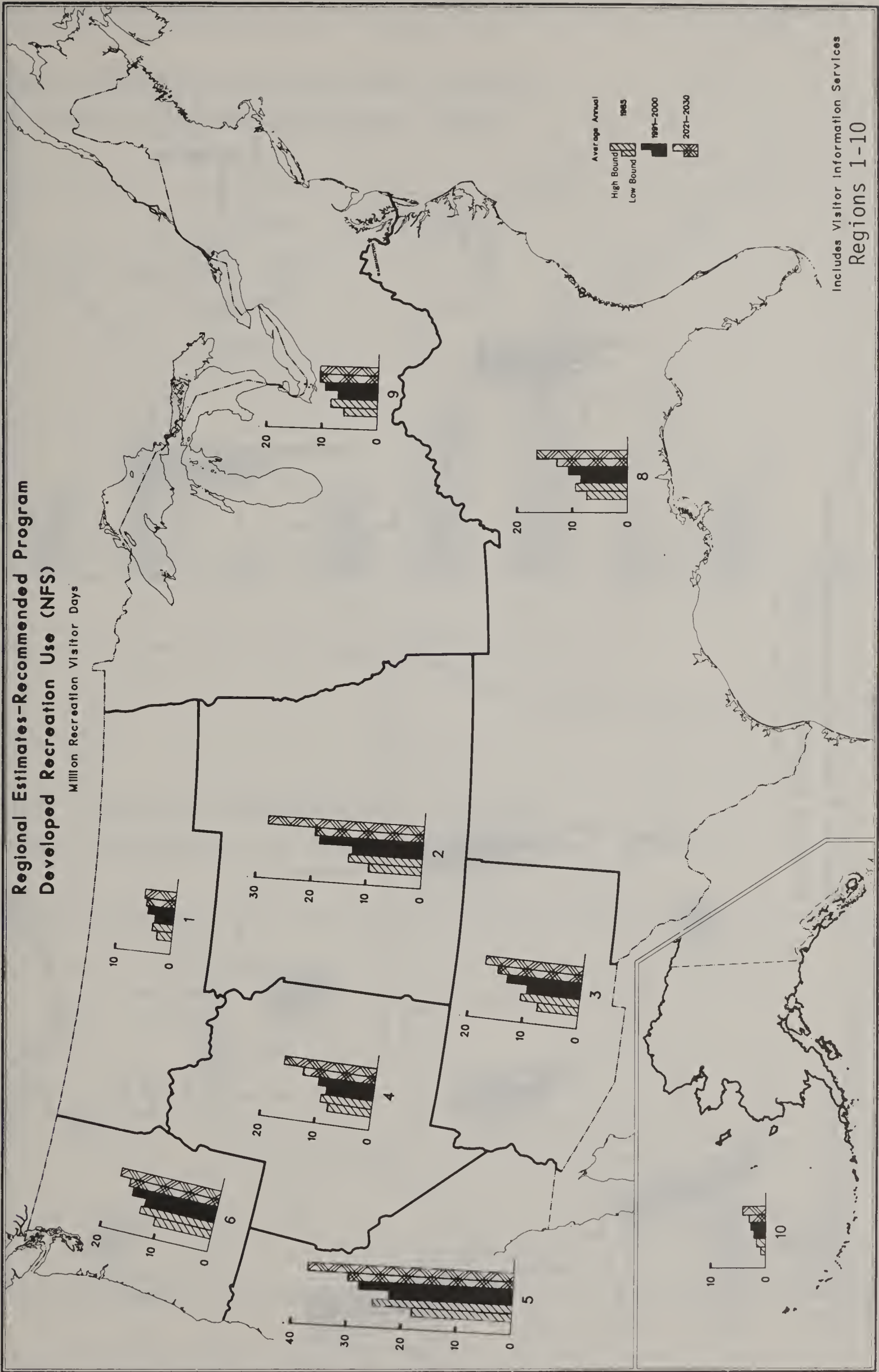
Program Objectives.--The Recommended Program will provide technical assistance and advice to non-Federal landowners for dispersed recreation. Assistance provided through State forestry agencies will include nonincome-producing types of outdoor recreation on non-Federal public and private lands. Private owners desiring technical assistance for income-producing projects will be referred to the Soil Conservation Service or to private consultants.

Technical assistance will be provided primarily in the Southeast and near population centers of the Northeast and California (figure 1.6).

Figure 1.3

Regional Estimates-Recommended Program Developed Recreation Use (NFS)

Million Recreation Visitor Days



Includes Visitor Information Services
Regions 1-10

Figure 1.4

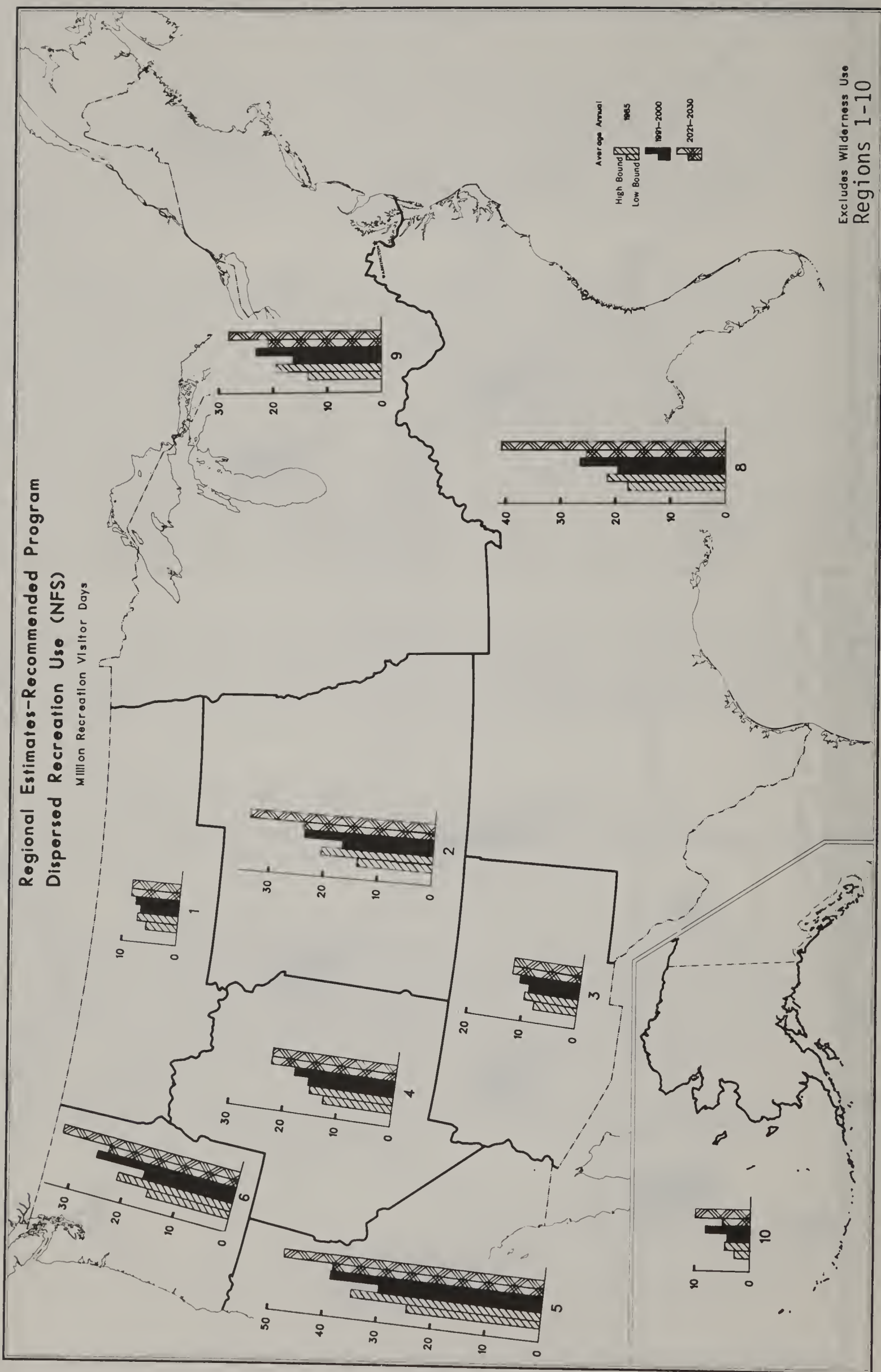


Figure 1.5

Regional Estimates-Recommended Program Trail Construction-Reconstruction (NFS)

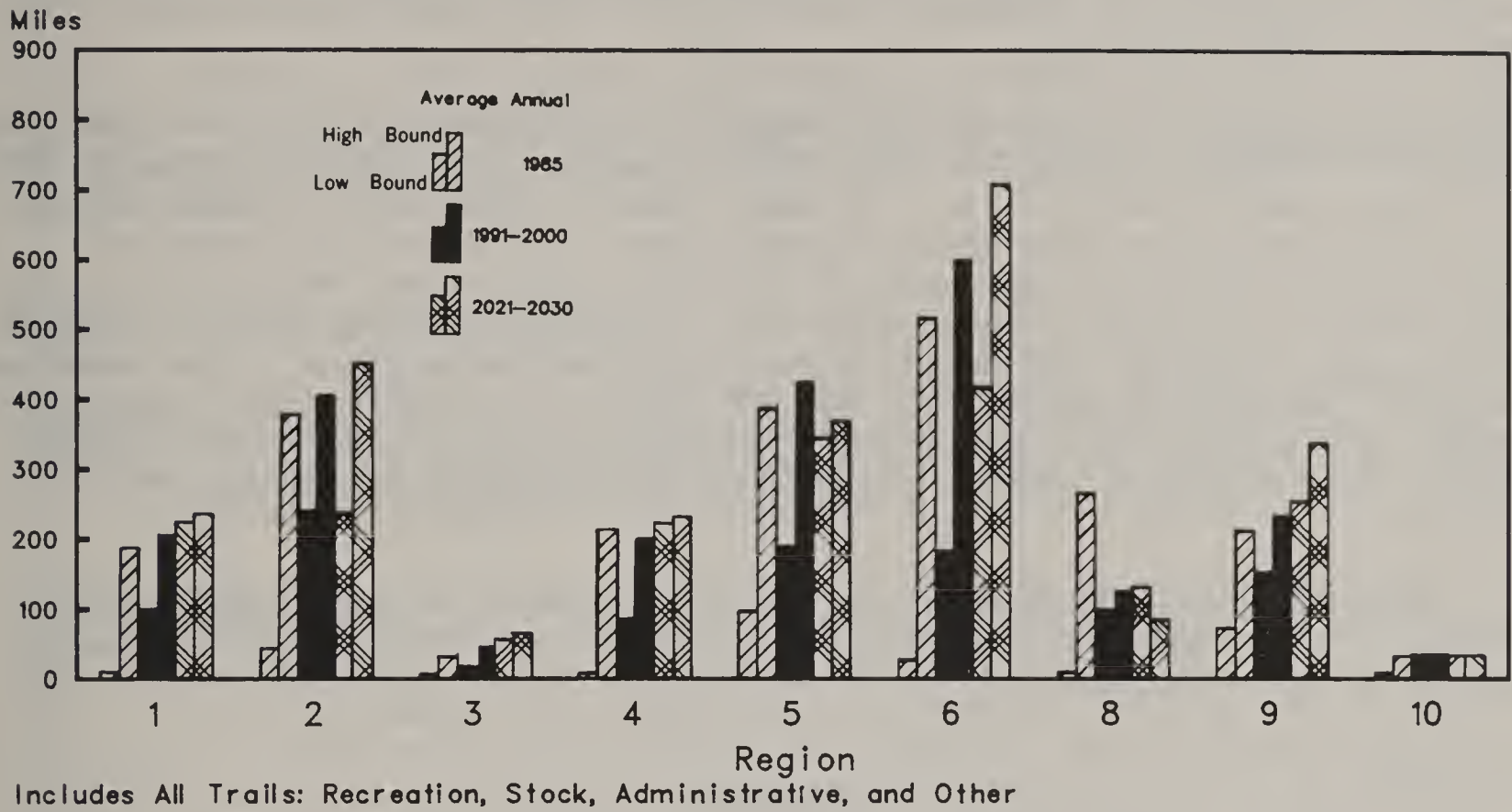
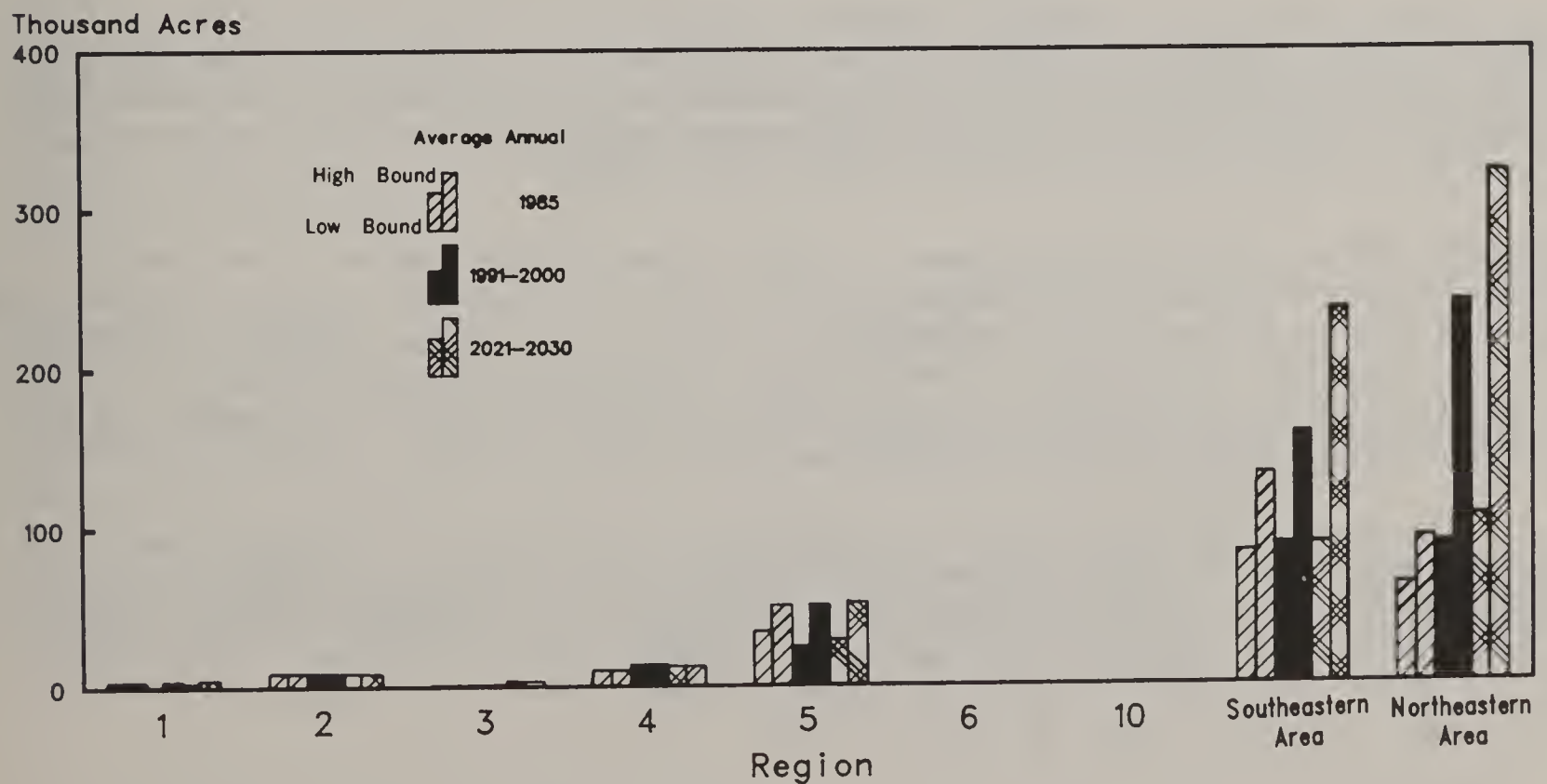


Figure 1.6

Regional Estimates-Recommended Program Technical Assistance for Dispersed Recreation (S&PF)



Research Program

Resource Goal.--Develop three kinds of scientific information on which to base management and policy decisions: (1) an understanding of factors that influence recreational demand and associated benefits; (2) methods to inventory, protect, and evaluate recreational supply opportunities; and (3) methods to improve management for recreation while maintaining production of other National Forest benefits.

Program Objectives.--Research would result in management systems and techniques to better integrate recreation with other values produced on forest lands such as timber, water, and wildlife. It would identify new ways to protect users and natural resources from vandalism and other forms of deviant behavior. Research would also provide new ways to enhance user safety while sustaining high levels of use and avoiding conflicts among users. More specific program results would include methods to enhance dispersed recreational experiences and benefits, new ways to efficiently measure use, methods to forecast trends in demand, and ways to encourage energy efficiency by better understanding the recreation consumption process and developing more efficient management programs.

Research program components dealing with impacts of recreation on wilderness and back-country resources are discussed in the wilderness management section of this document.

Wilderness

Assessment

Demand.--Recreational and other uses of wilderness have grown substantially since World War II, outpacing the overall growth of outdoor recreation. Even though this rapid growth rate has recently leveled off, it is anticipated that wilderness recreational use will continue to increase at an annual rate of about 2 percent.

Young adults are the most common visitors to the National Wilderness Preservation System. Although projections show that this segment of the population will grow more slowly in the decades ahead and eventually decline in relative proportion to the total population, there will be continued strong demand.

Supply.--The supply of wilderness in the United States can be increased to meet increasing demands by adding units to the National Wilderness Preservation System and by improving and expanding wilderness management opportunities on existing units. The Roadless Area Review and Evaluation Study (RARE II) completed in 1979 is expected to lead to legislation that will substantially increase the supply relative to demand.

The Bureau of Land Management estimates that more than 120 million acres of the land that it administers are roadless and undeveloped. These lands are being studied for possible wilderness designation as required by the Federal Land Policy and Management Act of 1976. 18/

18/ 90 Stat. 2743; 43 U.S.C. 1701.

State, local, and private lands are a potential source of wilderness. Nine States have established wilderness systems within their boundaries, and some corporations are designating "pocket" wilderness on their holdings.

Improvement in the management of designated wilderness can improve the quality of wilderness experiences. Development of a management plan, with adequate user control, can protect the resource, enhance the visitor experience, and spread use within the unit to increase the quality and quantity of use.

In response to the projected wilderness use demands and in consideration of Forest Service program opportunities that would effectively help meet them, the following Program goals and objectives for wilderness resource management and research are indicated:

National Forest System Program

Resource Goals.--Provide for wilderness use, protection of the wilderness resource, and reduction of conflict between the uses of wilderness and the wilderness values of solitude, naturalness, and ecological, geological, and similar features of scientific, educational, or historic value.

Program Objectives.--Wilderness areas estimated to be designated by Congress from the National Forest System would increase to about 41 million acres by 1985 at the High Bound and by only 1 million acres more after that (figure 1.7). At the Low Bound, the Program would increase NFS wilderness to 33 million acres by 1985 and about 1 million more by 2030. Large immediate additions to wilderness areas are anticipated through congressional action on the current Roadless Area Review and Evaluation (RARE II) recommendations. Much of the new wilderness would be in Alaska, although large wilderness areas would be maintained throughout the western half of the country. The Northeast's wilderness would also grow, approaching 2 million acres by the end of the planning period. But the South's share of wilderness would be stabilized at about half a million acres. For the remaining RARE II study areas and those RARE II areas not designated for wilderness, the Forest Service will develop plans consistent with the National Forest Management Act of 1976 and any additional congressional direction associated with wilderness designation.

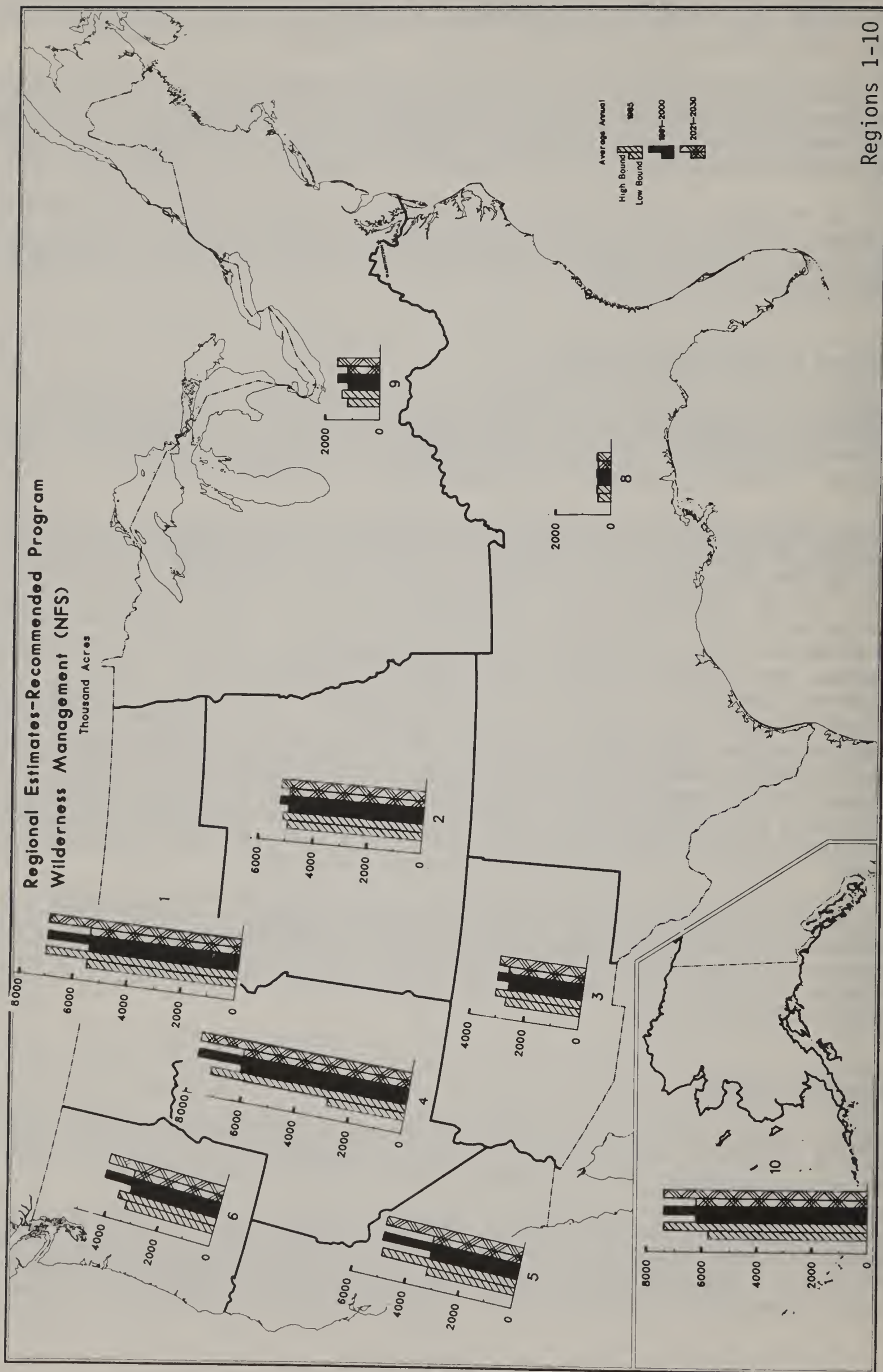
Wilderness management would be at a level necessary to protect and perpetuate wilderness values under both the High and Low Bounds. The Program would also provide for substantial increases in wilderness use. Targets and outputs in other programs such as timber and range could be met with this level of wilderness designation.

Research Program

Resource Goal.--Develop scientific principles to manage for sustained, high-quality wilderness amenity values, while maintaining the natural integrity and ecological features associated with the wilderness environment.

Program Objectives.--Research would determine ways to maintain and preserve the tranquility and integrity of wilderness environments, while allowing for sustained use. New data systems would be developed through which long-term ecological processes can be monitored. Where appropriate, management programs for

Figure 17



Regions 1-10

endangered and threatened species associated with wilderness environments would be developed.

The outdoor recreation research component of the wilderness element would deal with preserving the biological and physical integrity of wilderness resources as they are impacted by recreation. Research would focus on devising ways to sustain use while maintaining the resource, and on developing methods to revitalize impacted resources where overuse has occurred.

Wildlife and Fish

Assessment

Demand.--Increasing per-capita consumption, plus an increasing population, resulted in a 52-percent increase in domestic demand for edible fishery products from 1967 to 1976. It is clear that domestic and world demand for these products will continue to increase. This will result in strong markets for all salmon and freshwater fish harvested in the United States.

Social demands for wildlife and fish include cultural experiences, recreational hunting, fishing, and wildlife observation. Common expressions of these demands are numbers of participants and dollars spent to participate. Also, wildlife and fish occasionally play critical roles in the cultural life of particular subgroups of our population. Projections of participation in hunting and fishing suggest a substantial growth in these activities. By 1995, the demand in the United States will increase 29 percent for freshwater fishing, 46 percent for saltwater fishing, 20 percent for big game hunting, 10 percent for small game hunting, and 26 percent for waterfowl hunting. If the proportion of wildlife and fish use by landownership remains the same, demand for hunting, fishing, and appreciative use will increase by 8 million visitor days by 1995. Commercial demand for anadromous fish is virtually insatiable according to historical data, and far exceeds the potential for increases from the National Forests.

Ecological demands are those that exist because people believe that wildlife and fish have values beyond direct economic and social values. The clearest expressions of these demands are laws such as the Endangered Species Act of 1973. The numbers of people belonging to organizations that express concerns for the preservation of wildlife and fish also indicate ecological demands.

Supply.--Opportunities for Forest Service programs to improve the outlook for wildlife are primarily related to habitat management. Although the majority of hunting use takes place on private lands, Federal lands supply a significant share (table 1.13), and Federal lands and programs are frequently closely allied with those of States and private concerns.

Table 1.13.--Percentage distribution of days' hunting in the
United States by landownership and major activity, 1975

Ownership	All Hunting	Big-Game Hunting	Small-Game Hunting	Migratory Bird Hunting
Private	67	57	71	69
Federal	10	17	7	8
State	10	17	7	8
Public, unspecified	8	8	9	8
Unknown	5	3	6	4

Source: Table 4.10, 1979 RPA Assessment.

National Forests provide about 85 million pounds of anadromous fish, primarily salmon, to commercial and sport or personal use fisheries each year. The potential for increase is about 25 million pounds annually or about 30 percent. Supply depends upon regulation of harvests, improvement and maintenance of habitats, and the ability of hatcheries and bypasses through water developments to compensate for habitat degradation and migration route disruptions. Pollution abatement and other clean water programs are having favorable impacts on the supply of freshwater fish.

Specific opportunities to meet demands are:

- Conduct programs to increase food supplies and improve cover, stock desirable species, and more fully integrate wildlife and fish into the management of the forest, rangeland, and inland water base.
- Inventory, protect, and enhance habitats of endangered and threatened species and protect critical habitat of other species threatened by changes in the management and use of the land and water base.
- Transplant and artificially rear individuals in some circumstances.
- Expand waterfowl nesting habitats through purchase of key tract and wetland easements and through preserving and enhancing migration and wintering habitats.
- Fully integrate the planning, development, and use of fish with other water resources. Avoid damage to fish by terrestrial resource use.
- Ensure free passage of anadromous species to freshwater spawning sites.
- Provide access by constructing trails, boat landings, and other facilities to spread use where the existing wildlife and fish resources are underutilized.
- Limit the harvest of wildlife and fish to sustainable levels.
- Improve the coordination of wildlife and fish-related activities in all levels of government and in the private sector.

--Reduce forest and range-related pollution of the Nation's waters and waterways.

In response to the projected wildlife and fish use demands and in consideration of Forest Service program opportunities that would effectively help meet them, the following Program goals and objectives for wildlife and fish resource management, assistance, and research are indicated:

National Forest System Program

Resource Goals.--Maintain and improve habitat for endangered and threatened species on Federal and State lists and participate in recovery plans. Provide management plans for federally listed species.

Provide well distributed habitat diversity on each Ranger District, for all indigenous vertebrate and selected invertebrate wildlife species.

Improve wildlife habitat for appreciative (nonconsumptive) enjoyment at 80 percent or more of the developed recreation and Visitor Information Service areas.

Manage anadromous fish habitat at 90 percent or more of potential and resident fish habitat at 80 percent or more of potential.

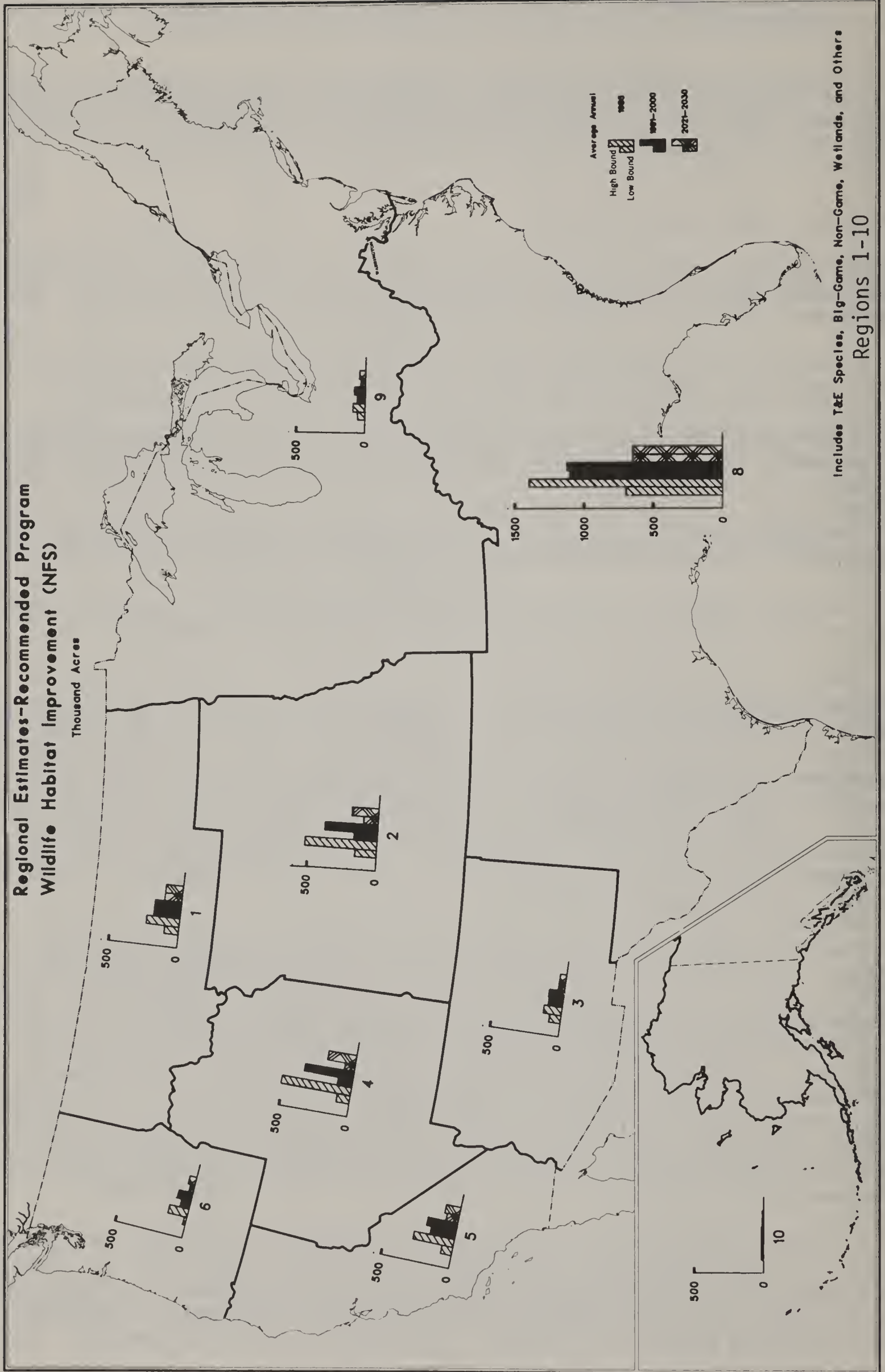
Provide habitat to maintain or improve populations of selected vertebrate species that are economically, socially, or ecologically important.

Program Objectives.--Annual wildlife habitat improvements at the High Bound would increase from 2.3 million acre equivalents in 1978 to 3.3 in 1985, then decline to 2.6 by 1995 and to 1.4 by 2025 (figure 1.8). Low Bound annual improvements would decline from 2.3 million acre equivalents in 1978 to 1.2 per year during the 1982-85 period, then increase to 1.9 in 1995 before declining to 1.1 in 2025. At both the High and Low Bound, no new capital investments would be made beyond 2000. Maintenance of habitat improvements would increase to 1995, then level off through 2025, as would wildlife populations dependent on improved and maintained habitat.

Wildlife habitat improvements decline in later years because it was assumed that many of the cost-effective improvements would be accomplished by 1995, and that later work would be to maintain earlier improvements. Although wildlife habitat improvements persist for years they do have finite lifetimes and must be replaced. Acre equivalents are an estimate of the area directly effected or made usable for habitat as a result of habitat improvements. The area effected is often greater than the actual area treated. The improvements are expressed in acre equivalents and used as a proxy for outputs because a better measure has not been developed. If outputs could be shown in terms of wildlife populations or in days of hunting or other wildlife use, both measures would show increases to 2005 and level off from then to 2025.

By 1995, wildlife and fish habitat improvement on National Forests would result in increased animal populations. At the High Bound, habitat management is expected to increase mule and white-tailed deer populations by 20 percent, black-tailed deer by 25 percent, elk by 18 percent, turkey by 38 percent, cavity-nesting birds by 10 percent, and resident trout by 20 percent. At the

Figure 1.8



the Low Bound, populations for mule, white-tailed and black-tailed deer would be expected to increase 5 percent, and for anadromous fish 10 percent. Other species populations would be maintained.

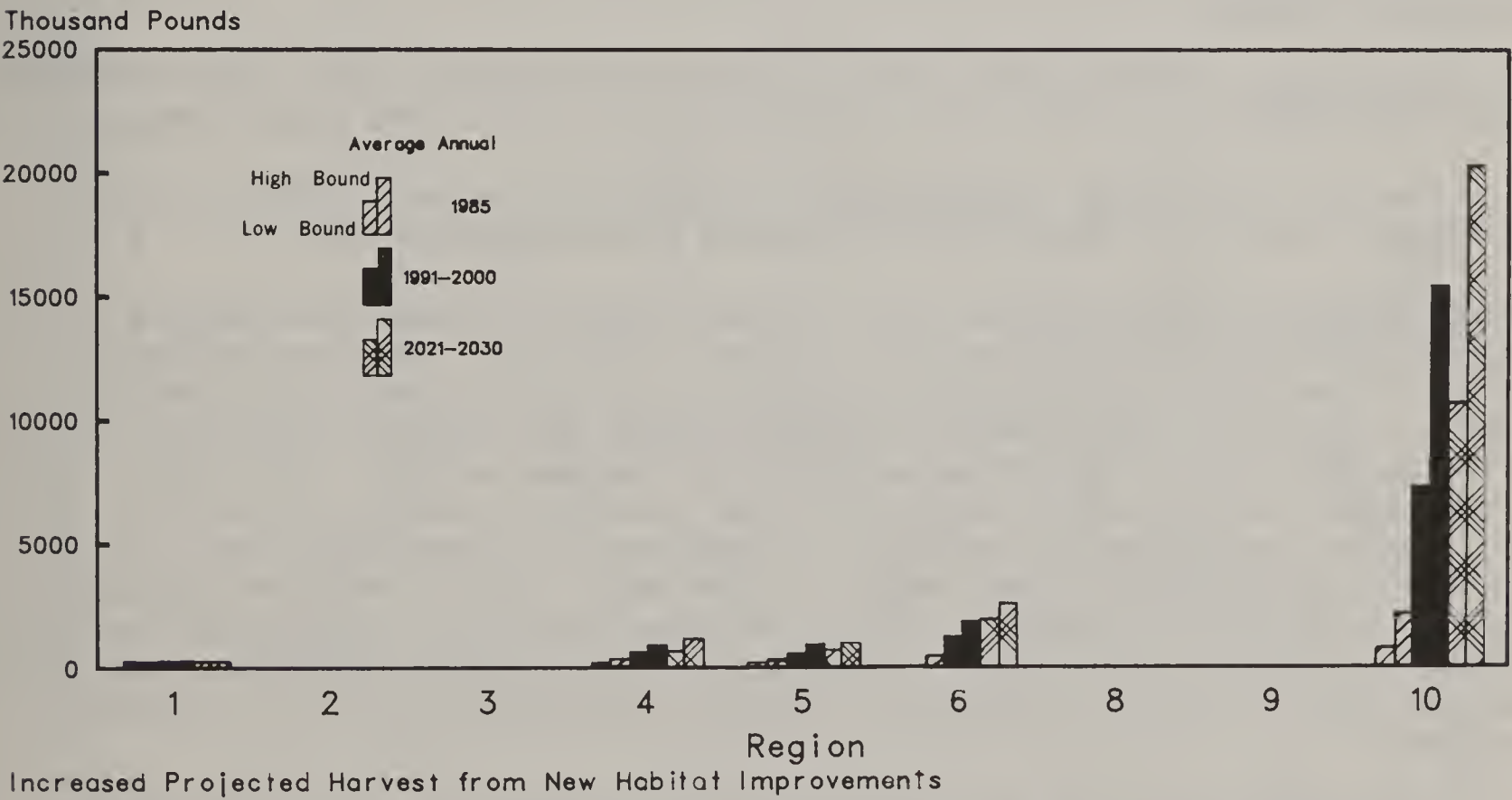
The contribution of the National Forest System to the commercial salmon fishery at the High Bound would increase 3.8 million pounds by 1985. The annual increase resulting from the Program would be 19.6 million pounds in 1995 and 25.5 million pounds by 2005. It would remain at that level through 2025 (figure 1.9). At the Low Bound, increases in commercial salmon fish production would be 1.2 million pounds by 1985 and 13.9 million pounds by 2025. That level would be maintained through 2025.

The High Bound permits meaningful implementation of the cooperative plans developed jointly with the State fish and wildlife agencies pursuant to the Sikes Act. ^{19/} For 1981, \$40.8 million or 65 percent of cost of the cooperative plans is included. The Low Bound would initially cover 47 percent of the Sikes Act plan costs and then drop to 25 percent by 1985.

The scheduled habitat improvements at the High Bound would provide for 6.2 million visitor-days of increased fishing, hunting, and appreciative wildlife use by 1995, and then level off by 2025. At the Low Bound, there would be a slight decline in visitor-days.

Figure 1.9

Regional Estimates-Recommended Program Anadromous Fish (NFS)



^{19/} 88 Stat. 1369; 16 U.S.C. 670.

State and Private Forestry Program

Resource Goal.--Encourage nonindustrial private landowners to practice wildlife management within the context of multiple use, and encourage consideration of wildlife needs in the development of State forest resource plans and individual landowner plans.

Program Objectives.--The Program would provide technical assistance to enable landowners and managers to increase protection and improvement of fish and wildlife habitats, including those of endangered and threatened species, on private and non-Federal public forest lands (figure 1.10).

Technical assistance for wildlife and fish habitat improvements on these lands is provided under the Rural Forestry Assistance program through State forestry agencies. State service foresters coordinate wildlife habitat assistance and follow fish and wildlife habitat management principles when assisting with the management of natural resources on private and non-Federal public forest lands. Closer coordination with State fish and wildlife agencies will help to improve management of fish and wildlife habitat on private and other non-Federal public lands.

Greatest emphasis is in the East where private forest lands comprise a large proportion of the total and landowner interest is high and hardwood stands favor a large variety of both game and nongame animal species. An important part of technical assistance involves identification of endangered and threatened animal and plant species and subsequent protection and maintenance of their habitat in accordance with the Endangered Species Act.

Research Program

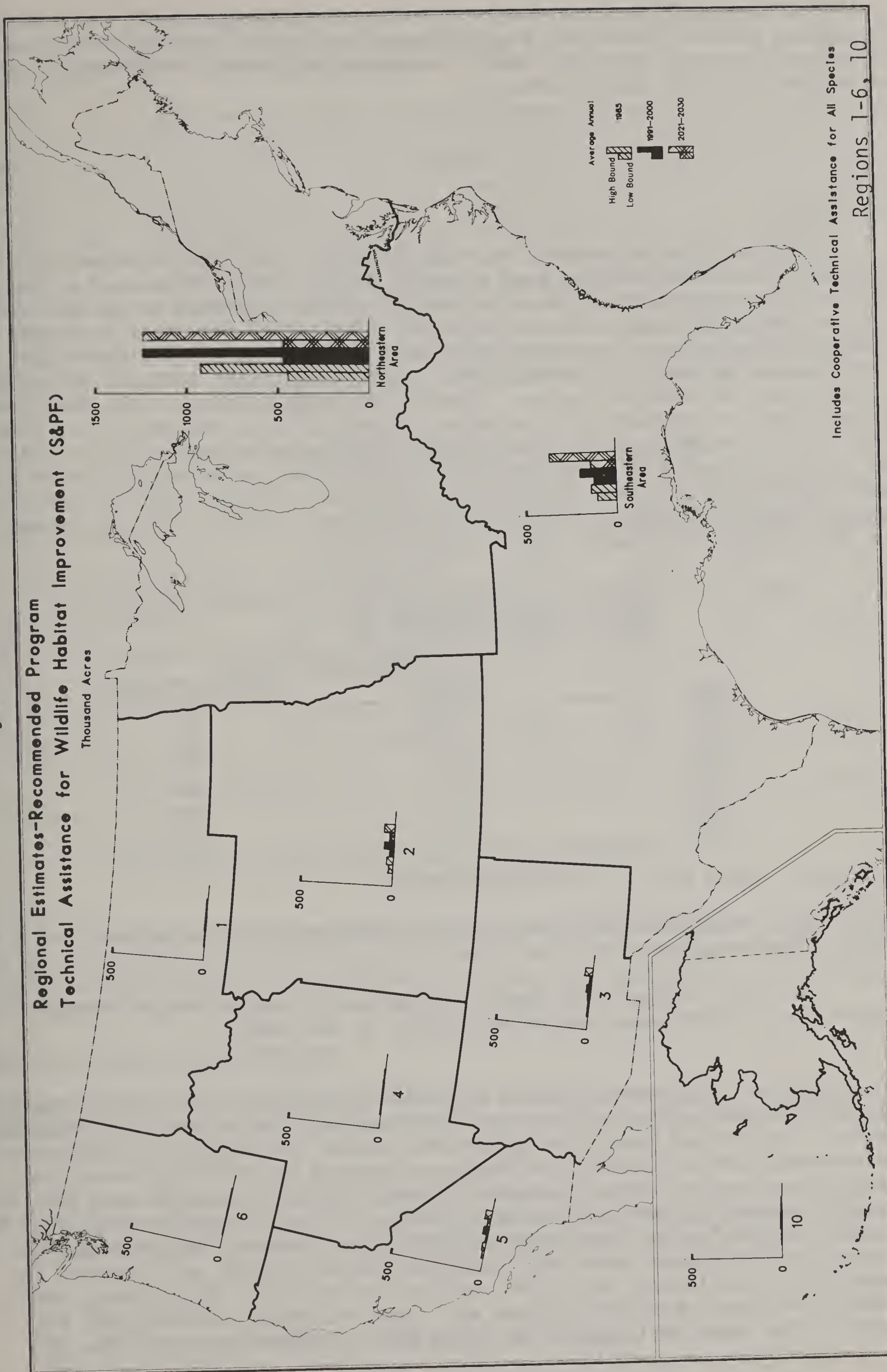
Resource Goals.--Develop the scientific knowledge necessary for the maintenance and improvement of wildlife and fish habitats on forest and range lands.

Develop technology necessary to maintain and improve wildlife and fish habitats, including habitat for endangered and threatened species.

Program Objectives.--Research would improve knowledge about the impacts of alternative land uses on game and nongame wildlife and fish populations and habitats and develop additional management systems for their enhancement. This includes the development of methods needed by resource managers to provide quality habitat for selected groups of nongame wildlife populations such as resident and migratory songbirds. New information would also be provided to improve the habitat and status of endangered and threatened species such as the peregrine falcon, bald eagle, timber wolf, and red-cockaded woodpecker. Research on salmon, steelhead trout, and other anadromous fish would provide better information about habitat requirements and provide guidelines and tools to mitigate the adverse effects of forestry and range activities on spawning streams.

Technology would be developed to provide information about the specific habitat requirements of many of the species currently designated or proposed for designation as endangered or threatened, so that potentially beneficial management activities can be implemented and potentially harmful activities can be altered.

Figure 1.10



Knowledge would be provided to protect and improve wildlife habitat. Technology would be developed to provide the additional information necessary to properly manage, maintain, and/or increase the habitat for selected groups of nongame wildlife populations.

Range

Assessment

Demand.--Projected demand for range grazing is derived from consumer demands for livestock products such as meat, hides, wool, tallow, and a long list of other byproducts. The main factors affecting demand for range grazing are the demand for meat, changes in relative prices of livestock feed, and changes in technology for producing livestock efficiently. The demand for meat is influenced primarily by population, economic activity, availability of meat substitutes, and similar factors. Demand for range grazing in the contiguous United States is projected to increase approximately 35 percent by the year 2000 and 41 percent by 2030 (table 1.14). The demand-supply analysis indicates the projected demand of range use on all lands that can be supplied with economic justification. Meeting the Forest Service's current share of the projected demand (5 percent of total range use) would require range management and development investments above current levels.

Table 1.14.--Index and projected demand for range grazing from demand-supply analysis 1/

Year	Projected demand	
	Index	Million AUM 2/
1976	100	213
1990	127	270
2000	135	287
2010	136	290
2020	138	295
2030	141	300

Source: Table 5.12, 1979 RPA Assessment.

1/ Projected rise in real values of grazed roughage are derived from the projected price of hay.

2/ AUM - Animal Unit Month, the measure of the amount of forage required by a 1,000-pound cow or equivalent in one month.

Supply.--Supply opportunities are based on estimates of grazing capacity within a framework of actual use and environmental limitations. In many instances, the desired quantities of grazing can be achieved without adverse environmental effects other than those represented by conflicts among the several land uses. The environmental impacts of grazing depend upon the number of livestock allowed and how well grazing systems are designed to meet the physical and biological limitations of the site. Ranges that are properly stocked and are grazed under well designed grazing systems will improve in productivity, ecological condition, and soil stability. In contrast, overstocking or poorly designed systems will lead to adverse impacts upon all parts of the range environment including soils, vegetation, wildlife, and

streams. The condition and the capacity of the rangelands has been improving in the last decade. 20/ This trend must be continued in the future to meet the projected demand for range grazing.

The most extensive range grazing opportunities are on private lands. Two-thirds of the Nation's range and many of the most productive ecosystems are privately owned (table 1.15). Federal lands make up the balance of the range area and produce 13 percent of the total livestock animal-unit-months (AUM) of grazing use. Grazing on Federal land is commonly seasonal and integrated with private lands to provide year-long forage for economically viable grazing operations. Opportunities for increasing the supply from Federal lands are discussed further in the 1979 RPA Assessment. The current range supply includes some significant excess supply relative to current use because the present cattle herd (110.9 million head) is substantially below levels achieved in 1975 (127.9 million head). Therefore the herd can be expanded significantly before there will be need to expand new forage opportunities.

Table 1.15.--Opportunities for range grazing

Source	Units	Forest Service	Other Federal	Non-Federal	Total
Grazing Production <u>1/</u>	Million AUM	10.1	18.3	184.6	213.0
Herbage & Browse Production <u>1/</u>	Million Tons/yr Ave. lbs/acre	47.4 568.0	53.9 490.0	352.3 854.0	453.6 751.6
Land Base <u>2/</u>					
Grazed	Million acres	101.8	156.1	531.1	789.0
Ungrazed	Million acres	63.6	64.0	287.1	418.0

1/ 1979 RPA Assessment data on file with USDA Forest Service, Washington Office.

2/ Derived from Table 5.4, 1979 RPA Assessment.

In response to the policy decision that the National Forest System should concentrate on balancing efficiency of range use with ecosystem stability, the following Program goals and objectives for range use management, assistance, and research are indicated:

National Forest System Program

Resource Goals.--Where it is cost-efficient to do so, develop and manage range ecosystems for livestock grazing so that range use and ecosystem stability are brought into balance.

For areas that do not meet the cost-efficient criterion, provide grazing for livestock in a way that will not cause adverse social and economic impacts on dependent communities, the disadvantaged, and owners and operators of

20/ Review Draft, 1980 RCA Appraisal, Part 1, pp. 3-1--69.

associated family farms. Where this cannot be done without impairing environmental values, the lands will be shifted to an alternative use.

Program Objectives.--The Range Program is designed to provide grazing use where it is ecologically and economically efficient to do so, and adjusted to meet social, political, and environmental needs. It covers correction of serious range deterioration while maintaining short-term stability of dependent livestock operators. Minority participation in grazing programs is encouraged.

Only the best opportunities for cost-efficient grazing would be funded. While AUM's are used as an indicator to measure outputs from rangelands, these important lands also contribute other benefits. These include wildlife habitat, watersheds, and habitat for endangered and threatened species. Under the Low Bound of the Program, fewer acres would be treated in the near term. Similar levels of treatment would occur within both Bounds after 1995. Under the High Bound of the Program, as a result of improved range condition, livestock grazing use would increase slightly from 9.9 million AUM's in 1978 to 10.1 million AUM's in 1995 and to 10.6 million AUM's in 2030. At the Low Bound, grazing use would decrease in the near-term from 9.9 million AUM's in 1978 to 9.4 million AUM's in 1985 and remain at that level during the 1986-90 period. The Low Bound would recover to a level similar to the High Bound by 2000. Under both Program Bounds, grazing use would increase 8 percent to 10.6 million AUM's by 2030 (figure 1.11). Some intensification of grazing would occur on the most productive areas where investment costs are reasonable. The area grazed is projected to decline from 102 million acres in 1978 to 92 million acres in 2030 as some areas go to other uses. Ecological condition of grazed rangeland would be improved where treatments are cost efficient. Where improvement would not be cost efficient, livestock would be removed. Demonstrations of effective management will benefit private as well as public ranges.

State and Private Forestry Program

Resource Goal.--Provide technical assistance for improved forage production on nonindustrial private forested ranges in cooperation with other agencies.

Program Objectives.--The Program would provide technical assistance for forage production on nonindustrial private forested ranges, particularly in the Southeast (figure 1.12). Landowners would be encouraged to include range objectives in multiresource forest land management plans.

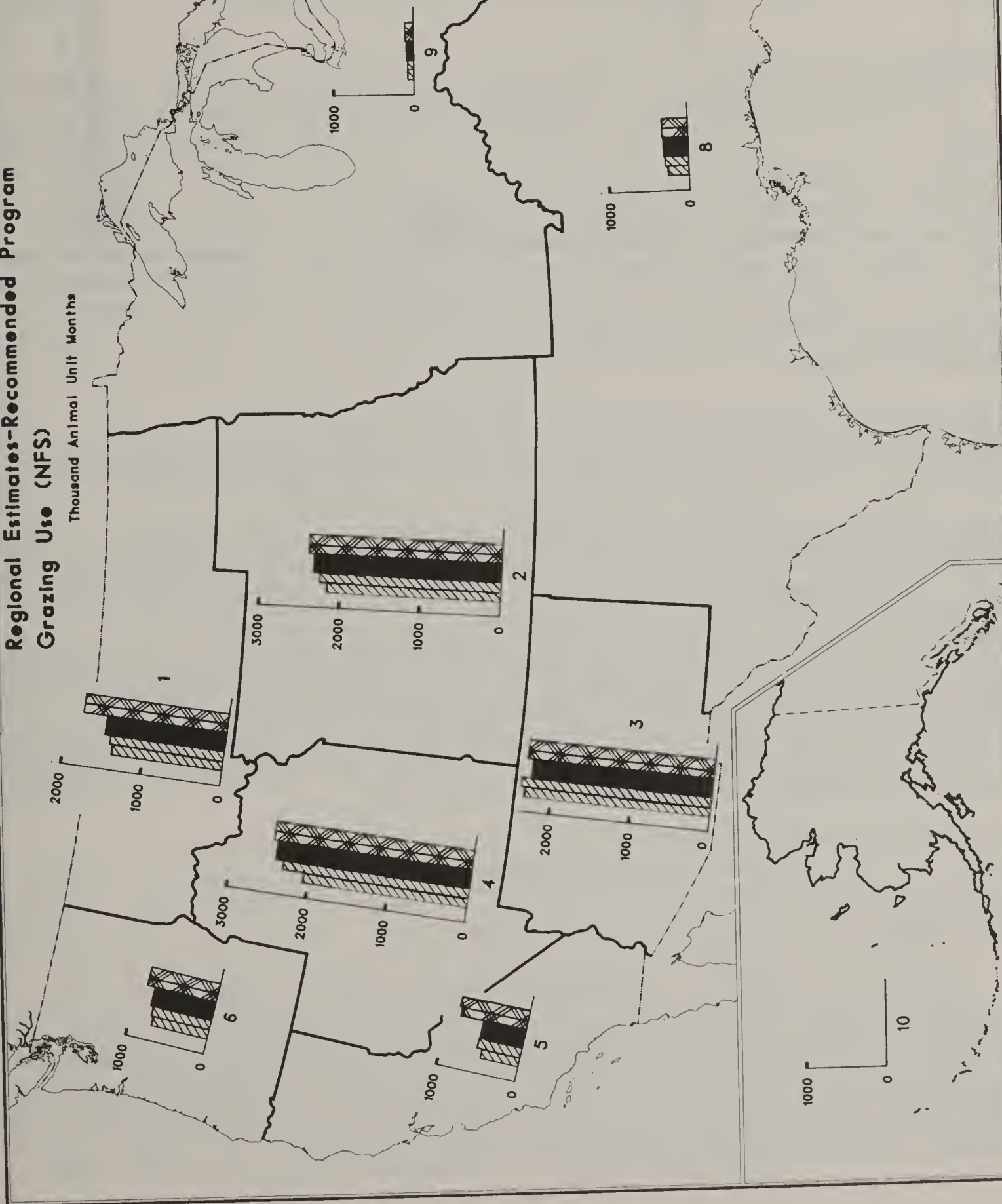
The Forest Service provides financial and technical assistance to State forestry agencies that in turn give on-the-ground assistance to landowners through technical advice and preparation of forest land management plans. The resources of other agencies will be utilized in providing technical range management assistance to landowners.

Opportunities exist to put available technology and skills to work toward increased development and implementation of sound range management practices on 80 million acres of State and privately owned forested range. Both the level of range management practiced on these lands and the supply of livestock products can be improved through increased education and on-the-ground technical assistance.

Figure 1.11

Regional Estimates-Recommended Program Grazing Use (NFS)

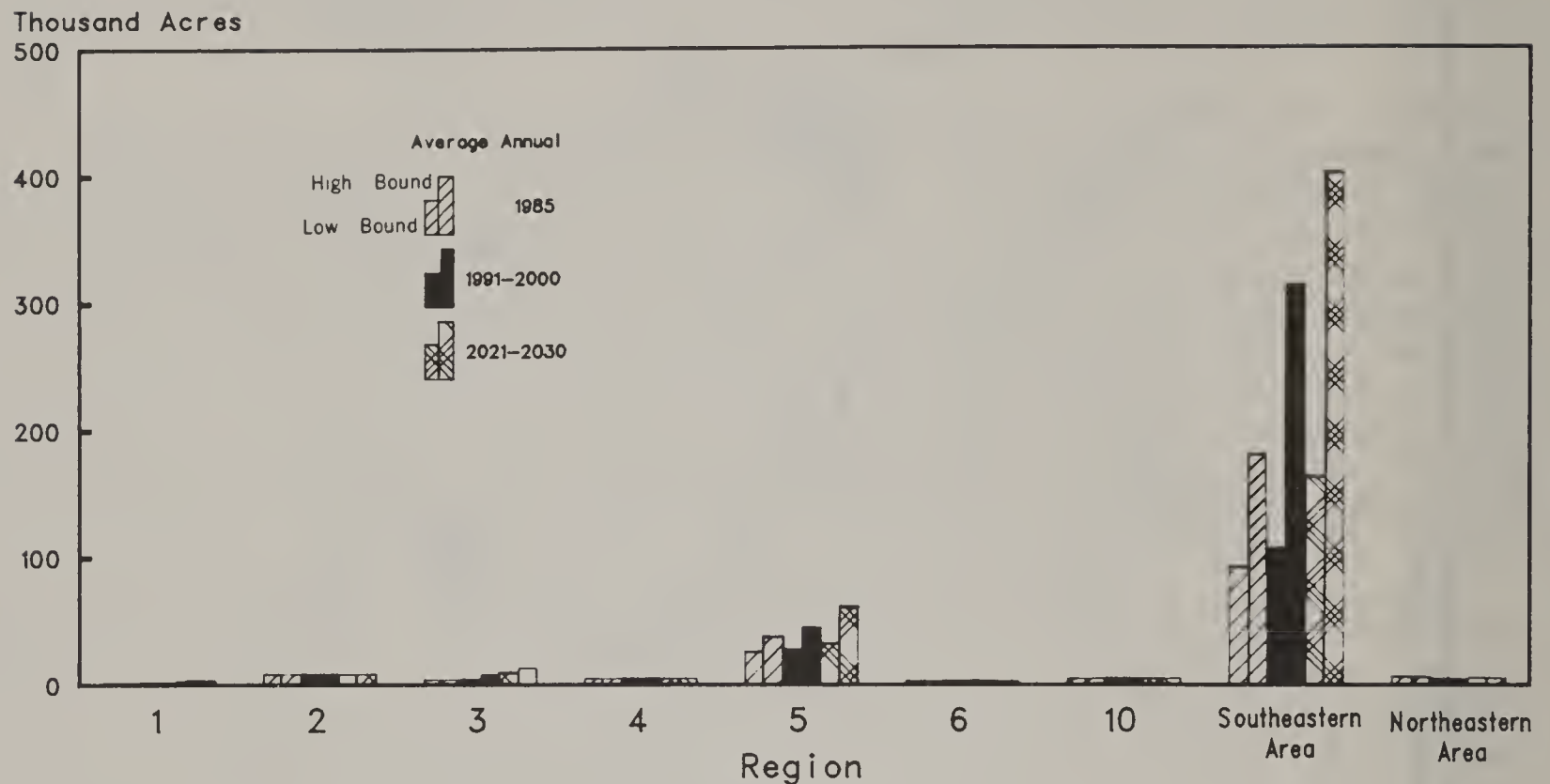
Thousand Animal Unit Months



Regions 1-10

Figure 1.12

Regional Estimates-Recommended Program Technical Assistance for Range Improvement (S&PF)



Research Program

Resource Goal.--Develop scientific knowledge necessary to increase livestock and forage production from rangelands and maintain other range resource benefits.

Program Objectives.--Range research would evaluate the livestock and forage production capabilities of rangeland ecosystems and develop management practices and grazing systems to improve production while maintaining other range resource benefits. Technology would be developed to permit sound use of rangelands with emphasis on revegetation, restoration of range ecosystems, enhancement of productivity, and integration of livestock and forage production with other range resource benefits. Methods would be developed to abate or reverse desertification processes and to provide systems and baseline ecological data to assess arid land resources, social demands, and techniques for the allocation and management of the arid land resources.

Timber

Assessment

Demand.--In response to increases in population, economic activity, and income, the consumption of most industrial timber products has risen rapidly in recent decades. In total, the consumption of industrial roundwood (the volume of the lumber, veneer and plywood, pulpwood, and other industrial products such as posts, poles and pilings converted to a roundwood base), rose from close to 10 billion cubic feet in 1950 to nearly 13 billion in 1978. In contrast to the industrial products, the use of fuelwood declined from 1950

to the mid-1970's. Since then, however, and in response to the increasing costs of crude oil, coal and natural gas, use of fuelwood has been rising, and substantially so in some regions of the country such as the Northeast.

Projections based on expected increases in population, economic activity, income and a continuation of recent trends (1950-76) in stumpage and timber product prices show that the demands for most timber products are likely to continue to grow rapidly in the decades ahead.

When all products are converted and added together, the medium projection of demand, given recent price trends, reaches 22.7 billion cubic feet in 2000 with a continuing rise to 28.3 billion cubic feet in 2030, more than double the 13.3 billion cubic feet consumed in 1976. Much of the projected increase in demand is for pulp products, consequently pulpwood accounts for slightly less than half of the total demand for roundwood in 2030 compared with a third in 1976.

Growth in roundwood consumption in the 1960's and 1970's consisted entirely of timber produced from softwood species. Consumption of hardwood roundwood has remained at about the same level since the late 1950's.

The projections show rather large increases for both softwoods and hardwoods. Assuming continuation of recent price trends, the medium projection of demand for softwoods is up 82 percent by 2030--from 10.3 billion cubic feet in 1976 to 18.7. Demand for hardwoods is projected to more than triple, rising from 3.0 billion cubic feet to 9.6. The faster rate of growth for hardwoods largely reflects the projected rise in demand for hardwood roundwood for pulp products, hardwood lumber for pallets and railroad ties, and hardwood plywood and veneer for furniture manufacture.

Part of the projected growth in demand can be met through improvements in the utilization and increases in net imports. However, these potentials are relatively small in comparison to total growth in demand. Projected demands for timber from domestic forests rise from 12.1 billion cubic feet in 1976 to 25.1 billion cubic feet by 2030--an increase of 107 percent. Associated demands for sawtimber rise from 60.7 billion board feet to 102.5.

Supply.--There is a very large domestic timber resource. About 737 million acres, 33 percent of the country's land area, is forest land. Nearly two thirds of this, or 483 million acres, is classified as commercial timberland, that is, land capable of producing at least 20 cubic feet of industrial wood per acre per year and not reserved for uses incompatible with timber production.

Farmer and other private ownerships--a diverse group that includes housewives, doctors, lawyers and numerous other occupations and retirees--contain 278 million acres, some 58 percent of the commercial timberland. Another 69 million acres, or 14 percent, are owned by forest industries. The remaining area, some 136 million acres, or 28 percent of the total, is in public ownership. The largest part of this, 89 million acres, is in National Forests.

Softwoods predominate in the Nation's timber inventory. In 1977, there was a total of 456 billion cubic feet of softwood growing stock including 1,985 billion board feet of sawtimber. The largest portion of the softwood timber inventory in 1977 was in National Forests, including some 46 percent of all softwood growing stock and more than one-half of the softwood sawtimber.

Most of this timber was in old-growth stands in the western United States. Some 27 percent of the softwood growing stock and 22 percent of the sawtimber was in farmer and other private ownerships. Most of this volume was in the East. Another 16 percent of the softwood growing stock and sawtimber volumes were in forest industry ownership, over half of this was in the West.

Hardwood growing stock inventories in 1977 totaled 255 billion cubic feet including 594 billion board feet of sawtimber. About 70 percent of these inventories were in farmer and other private ownerships and 13 percent on forest industry ownerships. The bulk of the hardwood timber in these ownerships was in the East--it was roughly equally divided between the North and South.

By most measures, the domestic timber resource situation has been improving and in a substantial way. For example, between 1952 and 1977, softwood growing stock inventories increased 11 percent and hardwoods 43 percent. Sawtimber inventories followed similar trends.

The current growth-removal balances show that domestic hardwood forests and eastern softwood forests can now support additional timber harvests. Assuming that commercial timberland owners continue to respond to price and inventory changes and manage their timber stands much as they have in the recent past, timber harvests can be increased substantially in most regions during the next few decades.

In total, projected softwood roundwood supplies rise from 9.5 billion cubic feet in 1976 to 12.3 billion cubic feet in 2030, an increase of 29 percent. The projected change in softwood sawtimber supplies over the same period is from 50.0 billion board feet to 55.6, a rise of 11 percent.

There are important differences in the outlook among the major softwood timber producing regions. The projected softwood sawtimber supplies in the Pacific Coast section drop substantially, from 26.6 billion feet in 1976 to 19.6 billion board feet in 2030, with much of the decline occurring by 1990. The major cause of the decline in the Pacific Coast is the physical incapacity of the forest industry lands to maintain current cutting levels. The old-growth inventory in this ownership class is rapidly being depleted and merchantable second-growth stands cannot offset the decline in supplies from old-growth stands.

In contrast to the Pacific Coast, softwood sawtimber supplies in the South are projected to increase from 18.0 billion board feet to 27.3 over the same period mostly on the farmer and other private ownerships. There are also increases in the North and Rocky Mountains but on a much smaller scale.

Hardwood roundwood supplies are projected to rise 2.7 fold between 1976 and 2030, from 3.3 billion cubic feet to 8.9. Sawtimber supplies more than double, moving up from 12.9 billion board feet to 27.5. Although less pronounced than the projected geographic shifts in softwood supplies, an increased share of hardwood timber supplies is also projected to come from the South.

Demand-supply comparisons.--Comparisons of projected increases in timber supplies with the projected demands (tables 1.16 and 1.17) indicate that the demands are rising faster than the supplies. Thus, the outlook is for a growing imbalance between the quantity of timber people would like to consume and the supply.

Table 1.16.--Summary of softwood timber demand on, and supply from, forests in the contiguous States by region, 1952, 1962, 1970, and 1976 with projections (medium level demand) to 2030 under alternative price assumptions

(Billion cubic feet)															
Region	Item	1952 1/	1962 1/	1970 1/	1976 1/	Projections									
						Base level price trends					Equilibrium price trends				
						1990	2000	2010	2020	2030	1990	2000	2010	2020	2030
Northeast	Regional demand 4/	0.47	0.40	0.43	0.45	0.57	0.66	0.71	0.74	0.77	0.54	0.60	0.65	0.70	0.75
	Regional supply 5/	.47	.40	.43	.45	.53	.57	.61	.64	.67	.54	.60	.65	.70	.75
	Supply--demand balance	0	0	0	0	-.04	-.09	-.10	-.10	-.10	0	0	0	0	0
North Central 6/	Regional demand 4/	.21	.19	.16	.16	.35	.44	.49	.54	.57	.33	.39	.45	.51	.55
	Regional supply 5/	.21	.19	.16	.16	.29	.35	.38	.41	.43	.33	.39	.45	.51	.55
	Supply--demand balance	0	0	0	0	-.06	-.09	-.11	-.13	-.14	0	0	0	0	0
Southeast	Regional demand 4/	1.65	1.50	1.71	1.79	2.82	3.30	3.62	3.73	3.85	2.63	2.92	3.22	3.38	3.54
	Regional supply 5/	1.65	1.50	1.71	1.79	2.27	2.54	2.71	2.82	2.90	2.63	2.92	3.22	3.38	3.54
	Supply--demand balance	0	0	0	0	-.55	-.76	-.91	-.91	-.95	0	0	0	0	0
South Central	Regional demand 4/	1.27	1.11	2.09	2.30	3.30	3.83	4.23	4.40	4.52	2.97	3.23	3.55	3.71	3.83
	Regional supply 5/	1.27	1.11	2.09	2.30	2.64	2.88	3.05	3.21	3.31	2.97	3.23	3.55	3.71	3.83
	Supply--demand balance	0	0	0	0	-.66	-.95	-1.18	-1.19	-1.21	0	0	0	0	0
Rocky Mountain	Regional demand 4/	.42	.62	.86	.75	1.14	1.25	1.37	1.44	1.54	1.03	1.08	1.17	1.25	1.36
	Regional supply 5/	.42	.62	.86	.75	.91	1.01	1.08	1.12	1.13	1.03	1.08	1.17	1.25	1.36
	Supply--demand balance	0	0	0	0	-.23	-.24	-.29	-.32	-.41	0	0	0	0	0
7/ Pacific Northwest: Douglas-Fir subregion (western Wash., western Oreg.)	Regional demand 4/	2.09	2.17	2.23	2.22	2.58	2.37	2.40	2.33	2.26	2.44	2.20	2.20	2.15	2.10
	Regional supply 5/	2.09	2.17	2.23	2.22	2.26	2.20	2.14	2.08	2.05	2.44	2.20	2.20	2.15	2.10
	Supply--demand balance	0	0	0	0	-.32	-.17	-.26	-.25	-.21	0	0	0	0	0
Ponderosa pine subregion (eastern Wash., eastern Oreg.)	Regional demand 4/	.33	.41	.56	.57	.65	.74	.83	.87	.92	.57	.61	.67	.71	.76
	Regional supply 5/	.33	.41	.56	.57	.54	.59	.63	.68	.72	.57	.61	.67	.71	.76
	Supply--demand balance	0	0	0	0	-.11	-.15	-.20	-.19	-.20	0	0	0	0	0
Pacific Southwest 8/	Regional demand 4/	.76	.83	.84	.85	1.00	1.02	1.05	1.05	1.06	.89	.87	.89	.89	.91
	Regional supply 5/	.76	.83	.84	.85	.77	.77	.80	.84	.88	.89	.87	.89	.89	.91
	Supply--demand balance	0	0	0	0	-.23	-.25	-.25	-.21	-.18	0	0	0	0	0
Total, all regions	Demand 4/	7.20	7.23	8.88	9.09	12.41	13.61	14.70	15.10	15.49	11.40	11.90	12.80	13.30	13.80
	Supply 5/	7.20	7.23	8.88	9.09	10.21	10.91	11.40	11.80	12.09	11.40	11.90	12.80	13.30	13.80
	Supply--demand balance	0	0	0	0	-2.20	-2.70	-3.30	-3.30	-3.40	0	0	0	0	0

1/ Data are estimates of actual consumption or harvests and differ somewhat from the "trend" estimates shown in the preceding section on timber supplies.

2/ Projections show timber demand on, and supply from domestic forests assuming that the price trends in the base period used in making the projections (roughly from the late 1950's through the mid-1970's) continue through the projection period.

3/ Projections show timber demand on, and supply from, domestic forests assuming that prices rise enough to maintain an equilibrium between projected demand and supply.

4/ Demand for products converted to a roundwood equivalent basis. The projections include adjustments for increased product yield per unit of roundwood input which are expected to result from improvements in utilization.

5/ The base level projections show the volume of timber available for harvest from regional forests if recent trends in the forces determining supply, such as commercial timberland area, management, and prices continue through the projection period.

6/ Includes the Great Plains States--Kansas, Nebraska, North Dakota, and eastern South Dakota.

7/ Excludes Alaska.

8/ Excludes Hawaii.

Note: Data may not add to totals because of rounding.

Data for 1952, 1962, 1970, and 1976 based on information published by the U.S. Departments of Agriculture and Commerce.

Projections: U.S. Department of Agriculture, Forest Service.

Source: Table 6.26, 1979 RPA Assessment.

Table 1.17.--Summary of hardwood timber demand on, and supply from, forests in the contiguous States by region, 1952, 1962, 1970, and 1976 with projections (medium level demand) to 2030 under alternative price assumptions

(Billion cubic feet)															
Region	Item	1952 1/	1962 1/	1970 1/	1976 1/	Projections									
						Base level price trends ^{2/}					Equilibrium price trends ^{3/}				
						1990	2000	2010	2020	2030	1990	2000	2010	2020	2030
Northeast	Regional demand 4/	0.55	0.55	0.54	0.52	0.73	0.88	1.03	1.17	1.30	0.72	0.85	0.98	1.13	1.22
	Regional supply 5/	.55	.55	.54	.52	.73	.88	1.01	1.14	1.24	.72	.85	.98	1.13	1.22
	Supply--demand balance	0	0	0	0	0	0	-.02	-.03	-.06	0	0	0	0	0
North Central 6/	Regional demand 4/	.98	.80	.75	.81	1.29	1.53	1.85	2.17	2.40	1.28	1.52	1.79	2.09	2.28
	Regional supply 5/	.98	.80	.75	.81	1.29	1.53	1.80	2.06	2.28	1.28	1.52	1.79	2.09	2.28
	Supply--demand balance	0	0	0	0	0	0	-.05	-.11	-.12	0	0	0	0	0
Southeast	Regional demand 4/	.77	.62	.63	.64	1.13	1.42	1.78	2.09	2.35	1.14	1.44	1.74	2.06	2.27
	Regional supply 5/	.77	.62	.63	.64	1.13	1.42	1.73	2.00	2.24	1.14	1.44	1.74	2.06	2.27
	Supply--demand balance	0	0	0	0	0	0	-.05	-.09	-.11	0	0	0	0	0
South Central	Regional demand 4/	1.27	.96	.89	.84	1.65	2.07	2.54	2.97	3.25	1.66	2.09	2.49	2.92	3.13
	Regional supply 5/	1.27	.96	.89	.84	1.62	2.02	2.41	2.75	3.00	1.66	2.09	2.49	2.92	3.13
	Supply--demand balance	0	0	0	0	-.03	-.05	-.13	-.22	-.25	0	0	0	0	0
West	Regional demand 4/	.03	.07	.09	.09	.10	.10	.10	.10	.10	.10	.10	.10	.10	.10
	Regional supply 5/	.03	.07	.09	.09	.13	.15	.15	.15	.14	.10	.10	.10	.10	.10
	Supply--demand balance	0	0	0	0	.03	.05	.05	.05	.04	0	0	0	0	0
Total, all regions	Demand 4/	3.60	3.00	2.90	2.90	4.90	6.00	7.30	8.50	9.40	4.90	6.00	7.10	8.30	9.00
	Supply 5/	3.60	3.00	2.90	2.90	4.90	6.00	7.10	8.10	8.90	4.90	6.00	7.10	8.30	9.00
	Supply--demand balance	0	0	0	0	0	0	-.20	-.40	-.50	0	0	0	0	0

1/ Data are estimates of actual consumption or harvests and differ somewhat from the "trend" estimates shown in the preceding section on timber supplies.

2/ Projections show timber demand on, and supply from domestic forests assuming that the price trends in the base period used in making the projections (roughly from the late 1950's through the mid-1970's) continue through the projection period.

3/ Projections show timber demand on, and supply from domestic forests assuming that prices rise enough to maintain an equilibrium between projected demand and supply.

4/ Demand for products converted to a roundwood equivalent basis. The projections include adjustments for increased product yield per unit of roundwood input which are expected to result from improvements in utilization.

5/ The base level projections show the volume of timber available for harvest from regional forests if recent trends in the forces determining supply, such as commercial timberland area, management, and prices continue through the projection period.

6/ Includes the Great Plains States--Kansas, Nebraska, North Dakota, and eastern South Dakota.

Note: Data may not add to totals because of rounding.

Data for 1952, 1962, 1970, and 1976 based on information published by the U.S. Departments of Agriculture and Commerce.

Projections: U.S. Department of Agriculture, Forest Service.

The prospective imbalances are largest for softwood timber. Projected demands on domestic forests for softwood rise from actual consumption of 9.2 billion cubic feet in 1976 to 13.8 by 2000 and 15.7 by 2030. Projected supplies of softwood roundwood from domestic forests show moderate increases from 9.2 billion cubic feet in 1976 to 11.1 in 2000 and 12.3 by 2030. The outlook for softwood sawtimber is similar--large increases in demand under the given assumptions and modest increases in supplies.

It is evident from these comparisons that a substantial rise in the relative prices of softwood stumpage, and most softwood timber products beyond the levels assumed in preparing the base level projections discussed above, will be necessary to balance demand and supplies in future decades.

Projections of indexes of regional equilibrium softwood stumpage prices, the prices necessary to bring about an equilibrium between the projections of timber demands and supplies, show softwood stumpage prices rising substantially in all regions (table 1.18). In the southern regions, stumpage prices measured in 1967 dollars and net of inflation or deflation, rise at an annual rate of 2.5 percent per year between 1976 and 2030. This is above the rate of increase in the Douglas-fir region of the Pacific Northwest (1.8 percent) and that in the northern regions (1.9 percent). It is, however, below those in the other regions and especially in the Rocky Mountain section where projected stumpage prices rise at an average rate of 3.8 percent per year.

In general, the demand-supply projections for hardwood--both roundwood and sawtimber--show a more favorable supply outlook than is the case for softwoods. It appears that supplies will be adequate in the next two or three decades to meet demands for most hardwood products. As a result, there may not be much increase in average hardwood stumpage prices in the years immediately ahead. Beyond the next few decades, however, base level demands begin to rise above base level supplies. As this occurs, stumpage prices will move upward, especially in the South Central region, where the competition for the available supplies is likely to be the most intense.

The reduction in demand associated with rising prices, will have important implications for the primary timber processing industries and particularly for the lumber industry. By 2030, for example, the demand for lumber, given rising relative prices, will be some 11 billion board feet below the level that would have existed without the increase in prices. This is a measure of market loss for the lumber industry.

The increase in supplies resulting from rising prices will be reflected in a corresponding increase in timber removals. This, in turn, will have some significant impacts on net annual growth and inventories. The largest impacts are in the South. By the end of the projection period, net annual growth of softwood growing stock in that section, given the higher levels of timber removals associated with equilibrium prices, would be only 75 percent of the base level projections. Softwood roundwood inventories drop even more rapidly and by 2030, amount to only a little over half of the base level projections discussed above. Inventories on the Pacific Coast are also substantially below the base level projections.

Declines in inventories of the sizes projected mean that maintaining equilibrium levels of harvests beyond the next few decades would require investments in various management programs, and especially softwood regeneration,

Table 1.18.--Indexes of trend level 1/ softwood and hardwood stumpage prices 2/ in the contiguous States, by regions, 1952, 1962, 1970, and 1976, with projections of equilibrium prices 3/ to 2030

(Indexes of prices per thousand board feet
International 1/4-inch log rule--1967=100)

Region	1952	1962	1970	1976	Projected indexes of equilibrium prices 3/				
					1990	2000	2010	2020	2030
<u>Softwood</u>									
Northeast	100.0	100.0	100.0	100.0	166.1	185.1	213.6	245.3	279.5
North Central	100.0	100.0	100.0	100.0	154.0	180.9	207.3	238.9	279.0
Southeast	57.8	83.3	111.6	138.9	229.6	280.0	358.0	434.6	526.8
South Central	57.8	83.3	111.6	138.9	230.6	281.6	358.5	434.3	524.7
Rocky Mountains	58.0	83.5	111.5	138.7	473.0	514.4	704.1	859.7	1045.0
Pacific Northwest: Douglas-fir subregion (western Washington and western Oregon)	43.8	75.9	118.0	164.2	275.0	228.2	287.4	355.8	430.3
Ponderosa pine subregion (eastern Washington and eastern Oregon)	80.6	93.1	104.4	113.8	300.5	330.6	425.1	500.8	608.1
Pacific Southwest	52.9	80.9	113.6	146.5	300.8	334.7	416.3	490.2	579.9
<u>Hardwood</u>									
Northeast	100.0	100.0	100.0	100.0	104.1	92.1	93.0	98.8	105.1
North Central	100.0	100.0	100.0	100.0	99.7	93.1	97.9	109.8	123.3
Southeast	100.0	100.0	100.0	100.0	113.9	99.1	101.7	112.9	126.4
South Central	100.0	100.0	100.0	100.0	136.3	123.6	137.3	166.9	203.0

1/ Indexes of prices on a least squares regression line fitted to time series price data for the years 1950-76 for softwoods, and the years 1962-70 for hardwoods.

2/ Prices are measured in constant (1967) dollars and are net of inflation or deflation. They measure price changes relative to the general price level and most competing materials.

3/ Indexes of the prices which would result from stumpage prices rising enough to maintain an equilibrium between projected timber demands and supplies.

Source: Tables 6.27 and 6.29, 1979 Assessment.

much larger than those implicit in the base level projections. It also suggests that without a large expansion in management programs, the recent and prospective growth in the timber processing industries in the South will be temporary, lasting only a few decades and followed by a sharp decline.

Although there are substantive adverse impacts on the timber processing industries, consumers of wood products would suffer the greatest losses from rising relative prices of timber products. Home buyers will be the most affected. The projected increase in softwood lumber prices would by 2030 result in a 7 percent reduction in the output of dwelling units. In total, it is estimated that consumers in 2030 will pay some \$7 billion more for wood products and competing materials because of the lack of enough softwood timber to maintain prices of softwood lumber and plywood at the 1977 level.

Opportunities to increase supplies.--The adverse impacts associated with rising relative prices of stumpage and timber products are not inevitable. There are large opportunities to increase and extend timber supplies. In 1976, average net annual timber growth per acre on all ownerships was only about three-fifths of that attainable in fully stocked natural stands. With the use of genetically improved trees, fertilization, spacing control, and other intensive management measures, much greater growth can be achieved, so much that no one really knows the biological limits.

With expected changes in management costs and stumpage prices, only part of the biological opportunities can be expected to yield an acceptable rate of return on the investments required to put them into practice. However, the economic opportunities to increase timber growth--those would yield 4 percent or more on the investment, measured in constant dollars--are large and, if carried out, would in time increase timber supplies in a major way.

A study by the Forest Service and the Forest Industries Council of these economic opportunities shows that the potential exists for intensifying management on 168 million acres of commercial timberland--some 35 percent of the Nation's total. ^{21/} With treatment of these acres, net annual timber growth could be increased by 12.9 billion cubic feet, a volume roughly equal to total timber harvests in 1976 and to three-fifths of the total net annual growth.

On an area basis nearly three-quarters of the economic opportunities to increase timber growth involve regeneration of nonstocked acres, harvesting mature stands and regenerating the harvested tracts, and converting existing stands to more desired species. A majority of the economic opportunities, 74 percent, is on farmer and other private ownerships which collectively contain about 58 percent of the commercial timberland. Most of the remainder are on the 14 percent of the commercial timberland in forest industry ownership. All economic opportunities on the National Forests are currently scheduled or planned and are not included.

If harvests from nonindustrial private forests are to increase, current levels of regeneration and growth must increase. There is currently a serious shortfall of reforestation following harvest. This problem is particularly

^{21/} Dutrow, George F., J. Michael Vasievich, and Merle E. Conkin, Economic opportunities for increasing timber supplies in the United States; USDA Forest Service and the Forest Industries Council (in press).

acute in the South where harvesting will produce an increasing share of mature softwood sawtimber. This is caused primarily by the absence of planned regeneration following harvest on many ownerships.

The study sponsored by the Forest Service and the Forest Industries Council indicates there are numerous opportunities for investments in reforestation and timber stand improvement that yield satisfactory financial returns. Most of these opportunities are in the South, but many are also found in the North and Pacific Coast.

An analysis of the 1974 Forestry Incentives Program ^{22/} indicated an average internal rate of return of 10.2 percent on direct treatment costs, both public and private. The study results emphasize the need for careful selection of sites to maximize effectiveness of Federal cost-sharing investments.

In addition to the opportunities for increasing timber supplies through management intensification, there are substantial opportunities for extending supplies through improved utilization. Automated stress grading of dimension lumber and improved engineering and construction practices could reduce the demand for wood materials in houses and other structures. It has been estimated that such improvements could save 10 to 20 percent of the dimension lumber required in a conventional house without loss in performance. Proper use of preservative-treated products, insecticides to control termites, and careful application of water-repellents could greatly extend the useful life of most wood products and reduce demand on timber resources. Improved maintenance and renovation of existing structures could also reduce demands for timber, and other materials as well, below the volumes needed for new replacement structures.

Before describing the timber program for the National Forest System it is important to briefly discuss shifts that have occurred in the productive forest land base. Forest land on the National Forests is divided into two broad classes: productive, and other. Productive forest land is further classified into productive reserved, productive deferred, and commercial forest land.

Productive forest land.--This is forest land that is producing or capable of producing crops of industrial wood. This includes all land that under management can grow crops of industrial wood, generally of a site quality capable of producing at least 20 cubic feet per acre of annual growth. This includes reserved and deferred areas and both accessible and inaccessible areas. Permanently inoperable or nonstockable areas are excluded because they are not suitable for silvicultural management.

Productive reserved.--Productive forest lands that have been legislatively withdrawn or administratively withdrawn by the Secretary of Agriculture or Chief of the Forest Service from timber production.

Productive deferred.--Productive forest land that has been legislatively identified or administratively identified by the Secretary of Agriculture or Chief of the Forest Service as possible additions to the wilderness system.

^{22/} Mills, Thomas J. and Daria Cain, 1978. Timber yield and financial return performance of the 1974 Forestry Incentives Program, USDA Forest Service Res. Paper RM-204, 56 pp.

Commercial forest land.--This is forest land that is producing or capable of producing crops of industrial wood and that has not been reserved or deferred. This category includes areas that can be managed to grow crops of industrial wood, generally of a site quality capable of producing at least 20 cubic feet per acre of annual growth, and includes both accessible and inaccessible areas. Permanently inoperable or nonstocked areas are excluded because they are not suitable for silvicultural management.

The amount of forested land in each class has fluctuated over the past 20 years, and such fluctuations are projected to continue in the future (table 1.19). Total productive forest land is projected to decrease due to losses to nonforest uses such as highways, transmission lines and reservoirs. During land and resource management planning forest lands will be classified as to their capability, availability, and suitability.

Table 1.19.--National Forest System forest land base shifts, 1961-79, and projections 1980-2030

Year	Total productive forest	Commercial forest land	Productive reserved	Productive deferred
(Thousand acres)				
1961	96,184	91,520	4,664	--
1969	102,821	96,059	6,762	--
1975	103,002	90,838	7,188	5,206
1979	102,572	89,865	7,613	5,094
1980	100,408	83,470	12,400	4,538
1990	98,793	81,425	16,045	1,323
2000	98,479	80,540	17,201	738
2010	98,180	79,939	17,662	579
2020	97,896	79,386	17,998	512
2030	97,623	78,913	18,260	450

Productive reserved forest will increase by about 3-1/2 million acres by 1990 because of expected additions to wilderness. Productive deferred, forest lands will be significantly reduced after 1990 because decisions will be made on the areas identified for wilderness study. Some areas will be shifted to the productive reserved category while other will be classified as commercial forest land.

Based on present trends, commercial forest land available for full multiple use is projected to decrease by about 18 percent from the high point in 1969. This reduction takes into account lands that cannot be harvested without irreparable damage to soil and water resources, and lands where regeneration cannot be established within 5 years of final harvest, in addition to the withdrawals discussed earlier. Until land and resource management planning

is completed in 1985, ^{23/} the full assessment of these lands will not be known. The updating of National Forest management plans will evaluate the current allocation of these lands through the examination of a wide range of production alternatives for all resources.

In order to help land managers increase the availability of commercial forest land, research and development are underway to provide methods that will permit harvesting of timber in steep terrain or on unstable soils without the irreparable damage that some current methods would do. One example is the development of the helistat system in which helicopters and gas-filled balloons will be combined to provide a means of removing timber with fewer roads and with minimal disturbance to the soil.

In response to the projected timber demands the following Program goals and objectives for timber management, assistance, and research are indicated for Forest Service programs:

National Forest System

Resource Goals.--Increase total timber supply from the National Forests by intensively managing those lands where timber production is cost-effective. As timber supplies are increased, meet demands for other resources without impairing environmental values.

Develop timber sale procedures that provide incentives to increase domestic timber supply through more complete utilization of timber resources.

Increase short-term timber offerings through departure from nondeclining even-flow where forest planning shows such departure is appropriate and consistent with the NFMA and the President's direction. ^{24/}

Encourage full use of available wood fiber from harvested and treated areas to the extent it is cost-effective.

Program Objectives.--At the High Bound, annual timber sale offerings would expand from 11.9 billion board feet local scale in 1981 to 12.5 billion board feet in 1985 and to 16.4 billion board feet in 2025 (figure 1.13). Harvesting, including regeneration, intermediate, and salvage harvests, would be extended to all commercial forest lands consistent with multiple use objectives. At the Low Bound, sale offerings would remain at 11.0 billion board feet from 1982 to 1990, and then rise slowly to 13.2 by 2025.

Harvests would be accelerated within sustained-yield principles in over-mature timber stands to increase effective growth, particularly in the National Forests of Oregon and Washington. Strict stocking level and species

^{23/} Land and Resources Management Planning (36 CFR 219) is required by the National Forest Management Act to be completed by 1985.

^{24/} The President's memorandum to the Secretary of Agriculture. June 12, 1979.

control over all commercial timber stands would be maintained. The minimum biological growth potential used to determine capability of land for timber production will be at least 20 cubic feet per acre per year. Regional Foresters may establish a higher standard in Regional plans.

As land management plans are completed on each National Forest in response to the Forest and Rangeland Renewable Resources Planning Act, departures from the nondeclining even-flow policy may be desirable to achieve multiple-use objectives. Departures would only be considered on those National Forests (1) where there are high mortality losses or where age-class distribution could be improved, facilitating future sustained-yield management; (2) where the nondeclining even-flow harvest schedule would result in a substantial adverse impact upon a community in the economic area in which the National Forest is located; (3) where the nondeclining even-flow harvest schedule of a National Forest fails to provide the National Forest's share of the national RPA Program targets.

Reforestation under the High Bound would increase from the present level of 440,000 acres to 470,000 acres by 1985, decline after that time reflecting completion of backlog acres, and then rise as timber harvest increases (figure 1.14). Low Bound reforestation follows a similar pattern, but some backlog acres would be deferred until after 1985. Timber stand improvement increases from 338,000 acres in 1981 to 408,000 acres in 1985 and 426,000 acres by the end of the planning period at the High Bound. At the Low Bound, this acreage would decline to 286,000 in 1985 and 255,000 by 2030.

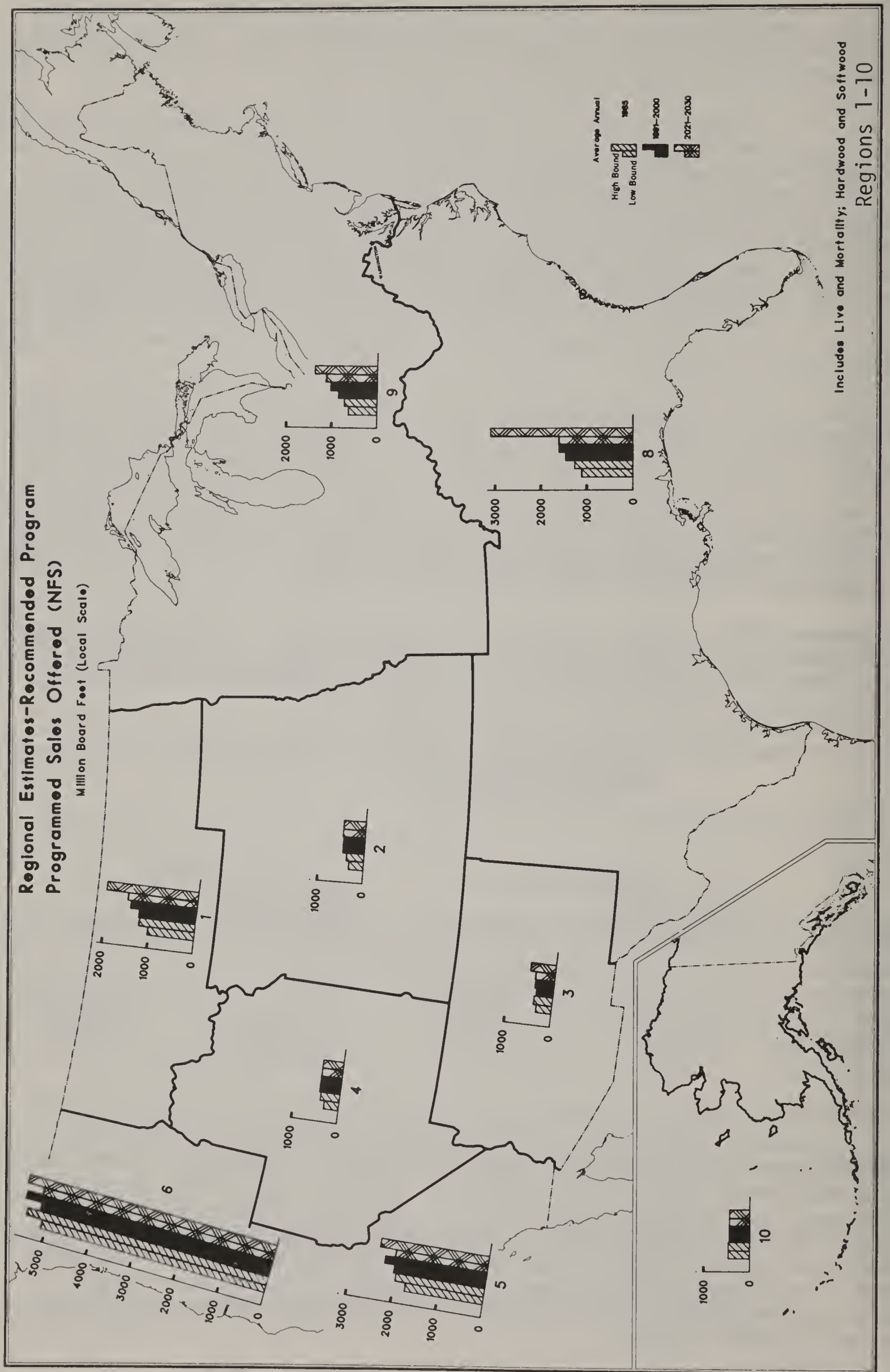
Between 1981 and 1985 a total of 459,000 acres now in reforestation backlog would be regenerated on the highly productive sites under the High Bound (table 1.20). At the Low Bound, 47,000 acres of reforestation backlog on highly productive sites would be deferred until 1986.

Table 1.20.--Forest Service schedule for reducing the reforestation backlog

Year	High Bound		Low Bound	
	Scheduled for reforestation	Balance	Scheduled for reforestation	Balance
	-acres-			
1979		881,947 ^{1/}		881,947 ^{1/}
1980	107,313	774,634	107,313	774,634
1981-85	458,762	315,872	411,762	362,872
Beyond 1985	315,872		362,872	

^{1/} About 316,000 acres of this backlog cannot be programmed for reforestation until after 1985 because of the lack of access, incomplete land management planning (RARE II is an example), constraints on herbicide use, economics, and other factors. About 566,000 acres are scheduled to be done between 1980 and 1985 under the High Bound. Only 519,000 acres are planned under the Low Bound with another 47,000 scheduled for 1986. It is possible that some of the 316,000 acres may never need to be programmed because of natural regeneration, land reclassification decisions, or other factors.

Figure 1.13



Timber management would be intensified in the South and the Pacific Coast regions. Timber production in the central and southern Rocky Mountains would increase moderately. Timber production in the northern Rocky Mountains would increase rapidly after 1995 as anticipated rapid increases in stumpage prices make increased production in this area cost-effective. Timber production in the North would increase moderately until 1995.

The Program at both Bounds provides a high present net worth among the alternatives originally considered. The Program responds to the projected increased demand for timber reflected in the Assessment, and results in a dampening of the projected rate of price increase for softwood timber products that would prevail if National Forest timber outputs were not increased. It also maintains or increases the Forest Service share of direct forestry employment in the western regions as well as creating new employment opportunities in the East. 25/

The Program includes the necessary reforestation and timber stand improvement work (figure 1.15) and access facilities to reach short- and long-term objectives and to improve forest conditions so that outputs can remain at levels as high or higher than shown for the end of the RPA planning period. These silvicultural activities will use integrated pest management methods to control and prevent damage from pest insects, diseases, vegetation, and animals.

State and Private Forestry Program

Resource Goals.--Assess the reforestation situation on nonindustrial private forest lands and work with States to encourage landowners to regenerate their lands promptly after harvest.

Increase the use of genetically improved planting stock on non-Federal forest plantations.

Develop a national program for timber price and market reporting similar to that for other agricultural products.

Work with other Federal and State agencies to assure that tax policies are consistent with national timber policy, especially as they relate to non-industrial private forest lands.

Accelerate adoption of technology that improves cost-effectiveness of harvesting, processing, and use of wood and wood-based products.

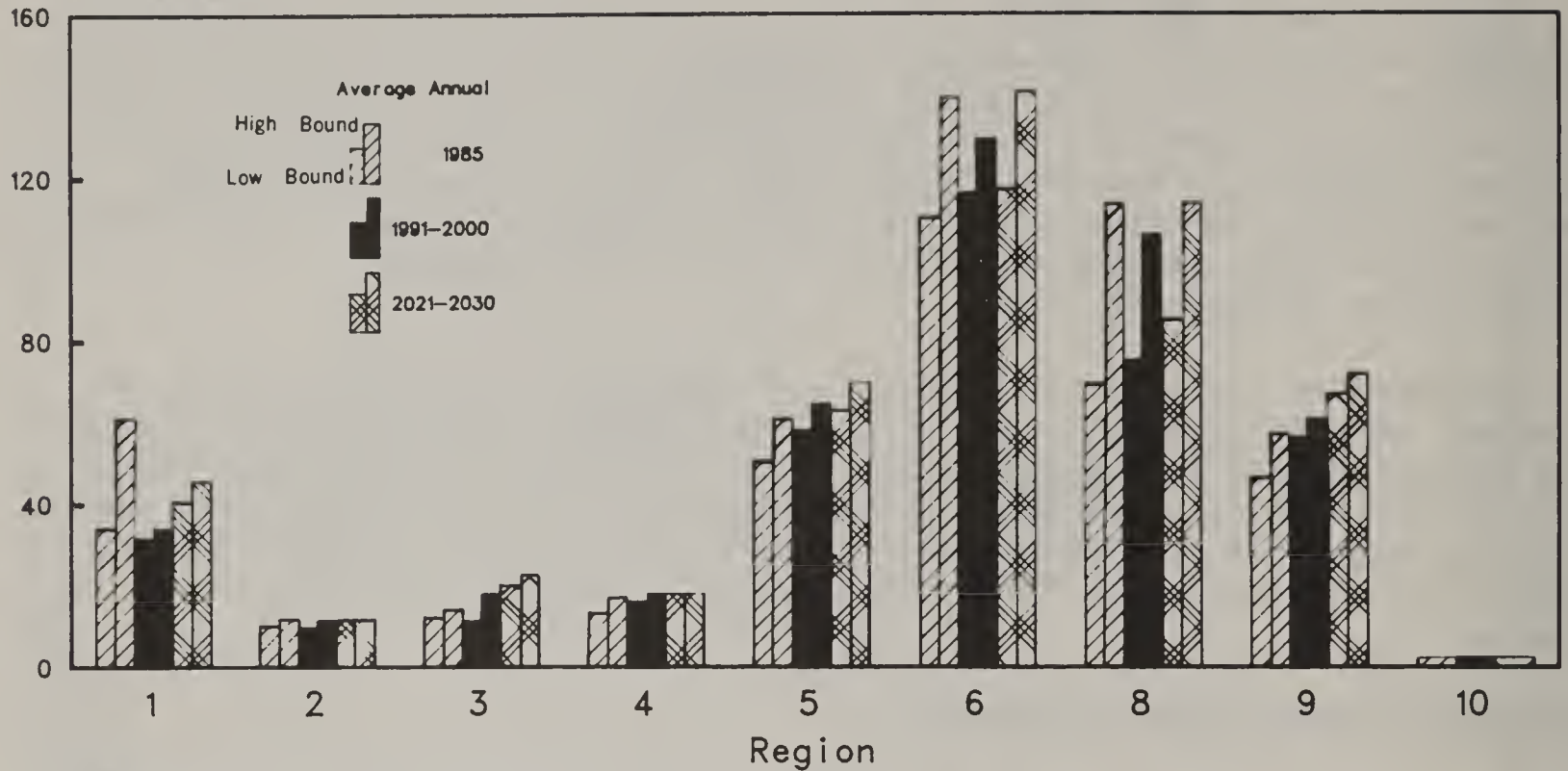
Program Objectives.--The Program will include technical assistance and advice to nonindustrial private forest landowners (figure 1.16) for timber stand improvement (figure 1.17), timber harvest (figure 1.18), and reforestation (figure 1.19). This assistance will be coordinated with forest industry programs that help these landowners. Analytical data to assess the cost-effectiveness of these assistance programs will be developed. Technical assistance will also be provided to loggers and processors for improved utilization of wood (figure 1.20). Assistance for timber management and improved wood utilization will include development, demonstration, and application

25/ A description of the economic impacts of the timber program, based on equilibrium projections, is presented in chapter 5.

Figure 1.14

Regional Estimates-Recommended Program Reforestation (NFS)

Thousand Acres



Includes KV and Appropriated Funds

Figure 1.15

Regional Estimates-Recommended Program Timber Stand Improvement (NFS)

Thousand Acres

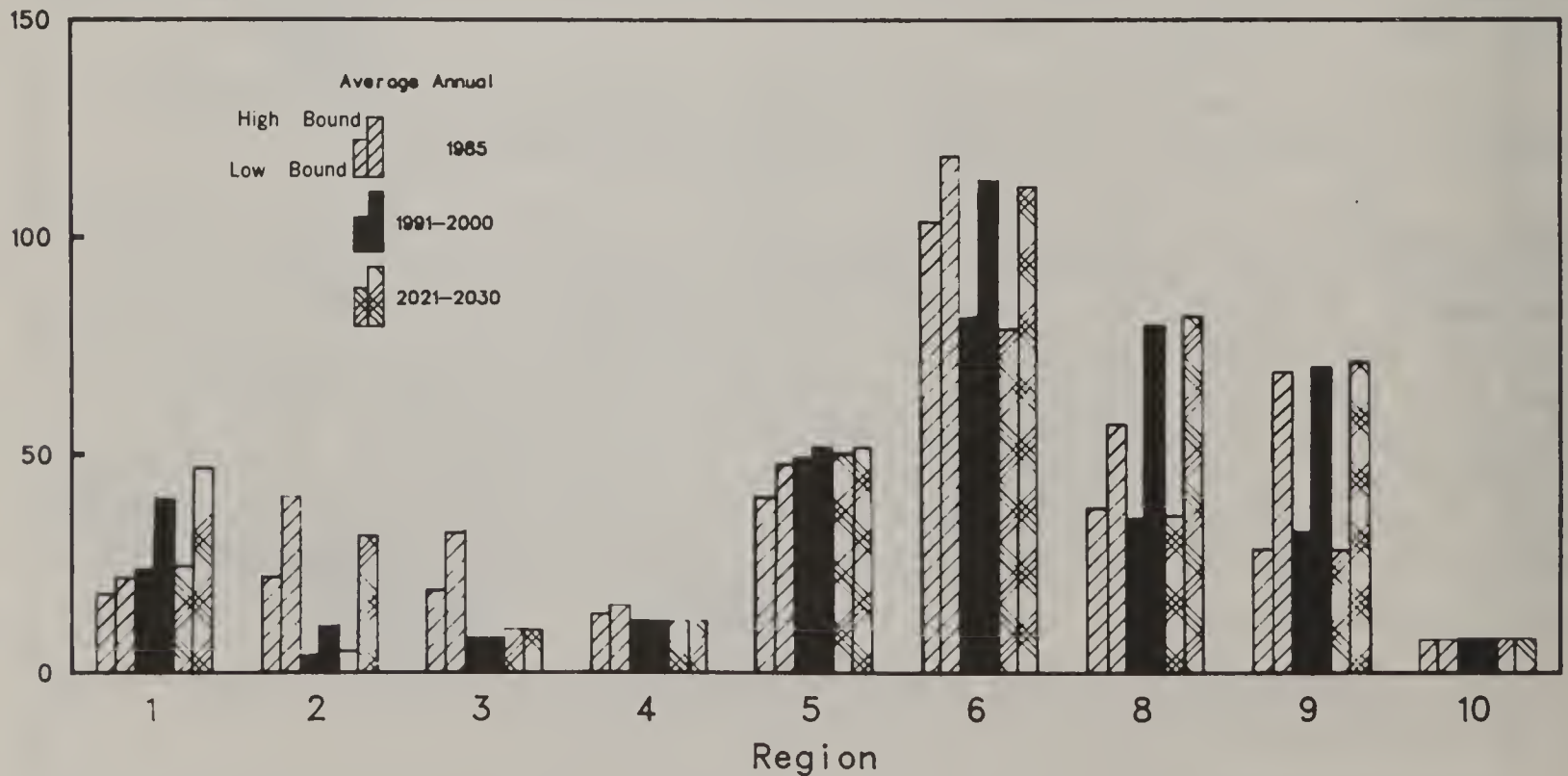
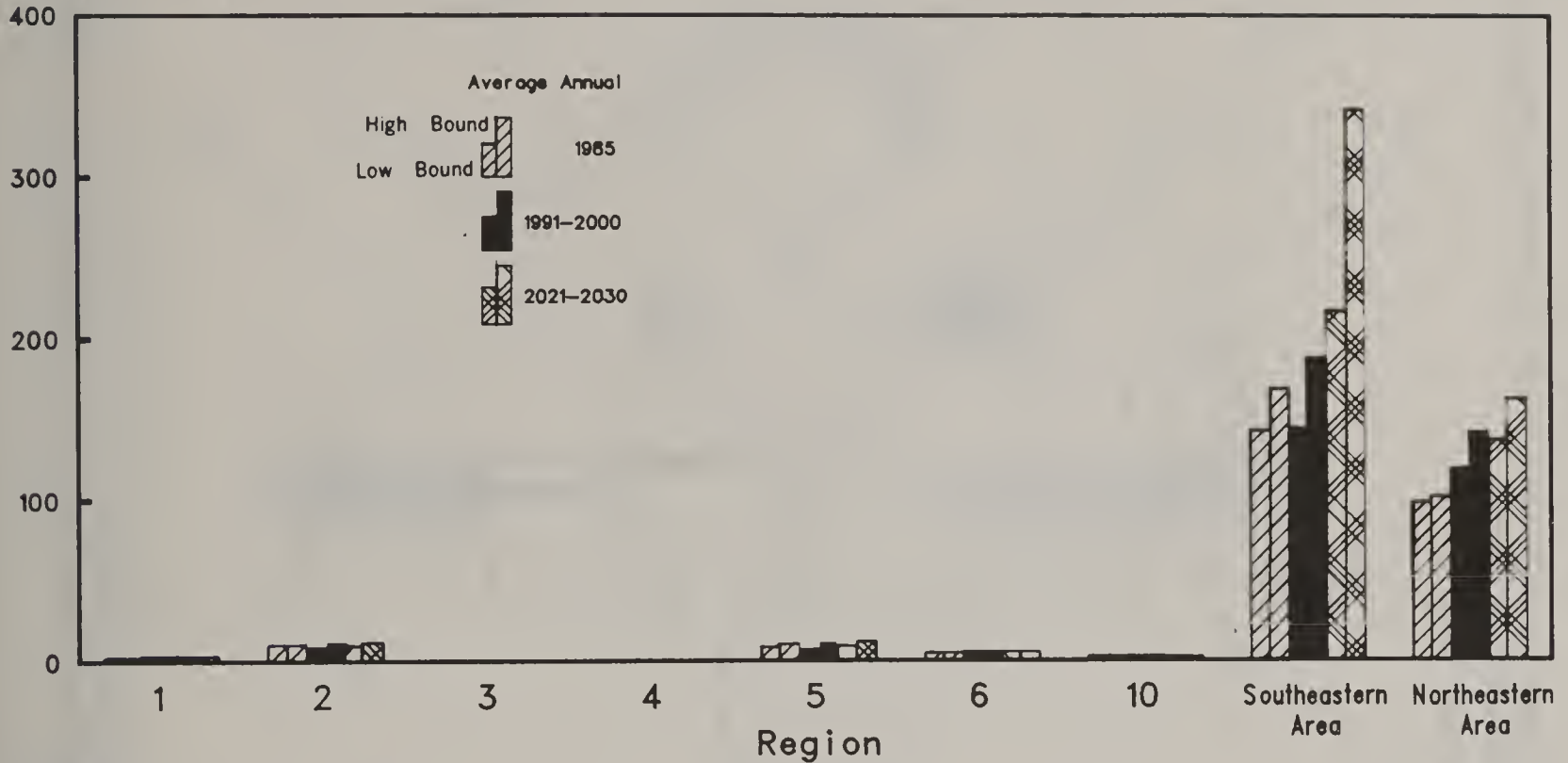


Figure 1.16

Regional Estimates-Recommended Program Woodland Owners Assisted (S&PF)

Thousand Owners

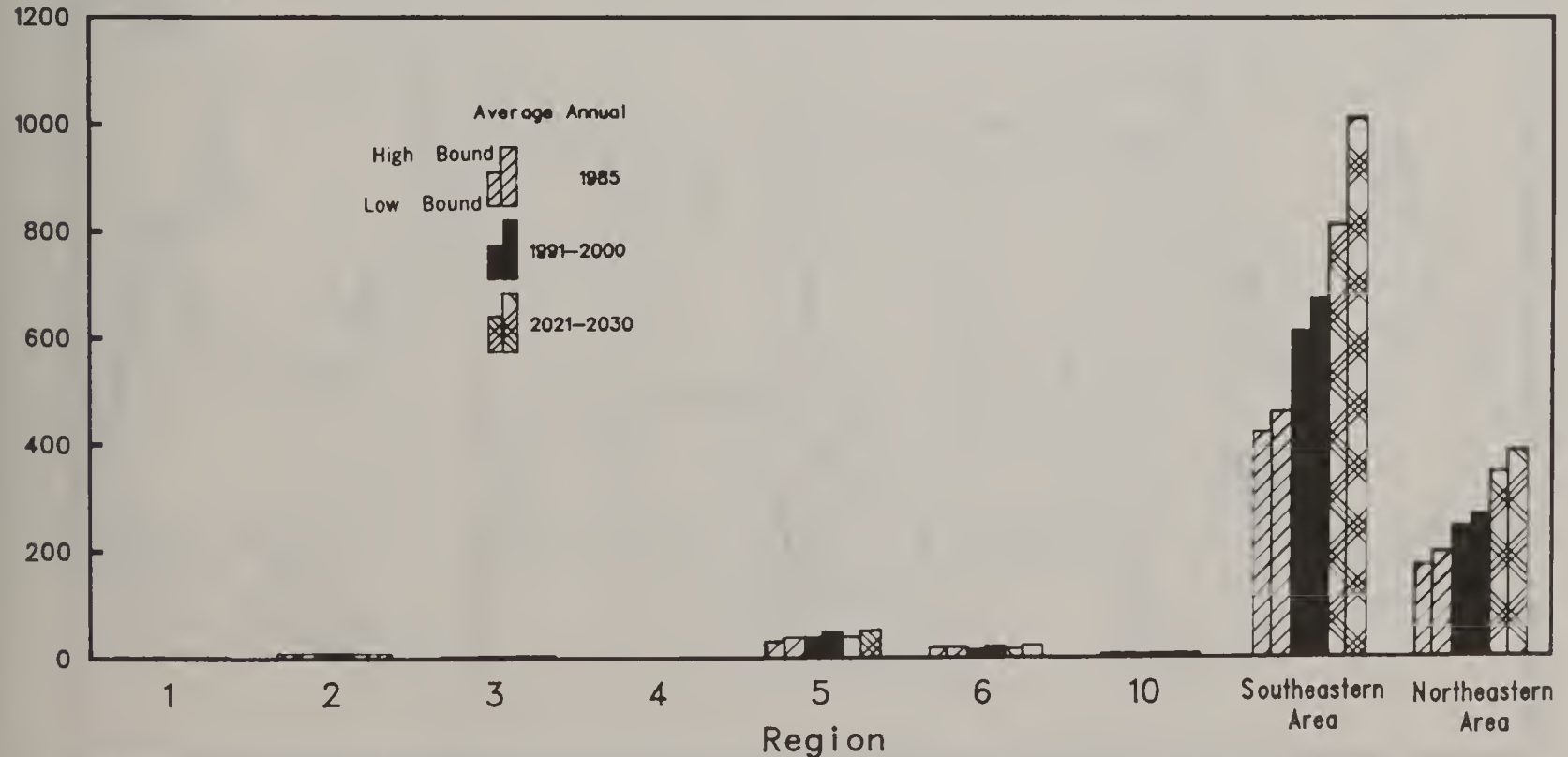


RFA Only

Figure 1.17

Regional Estimates-Recommended Program Timber Stand Improvement (S&PF)

Thousand Acres

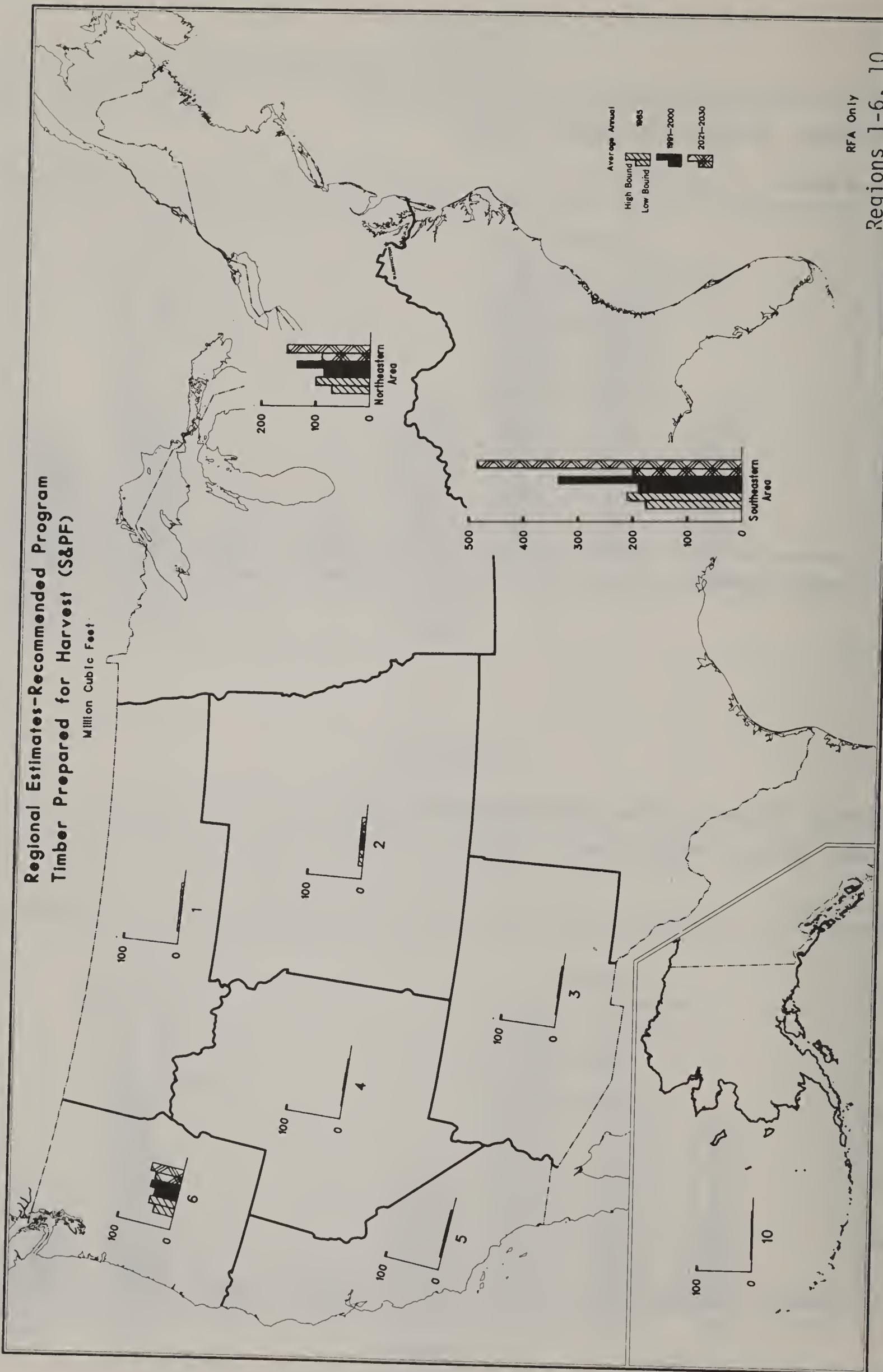


Includes RFA, FIP, and ACP

Figure 1.18

Regional Estimates-Recommended Program Timber Prepared for Harvest (S&PF)

Million Cubic Feet



RFA Only

Regions 1-6, 10

Figure 1.19

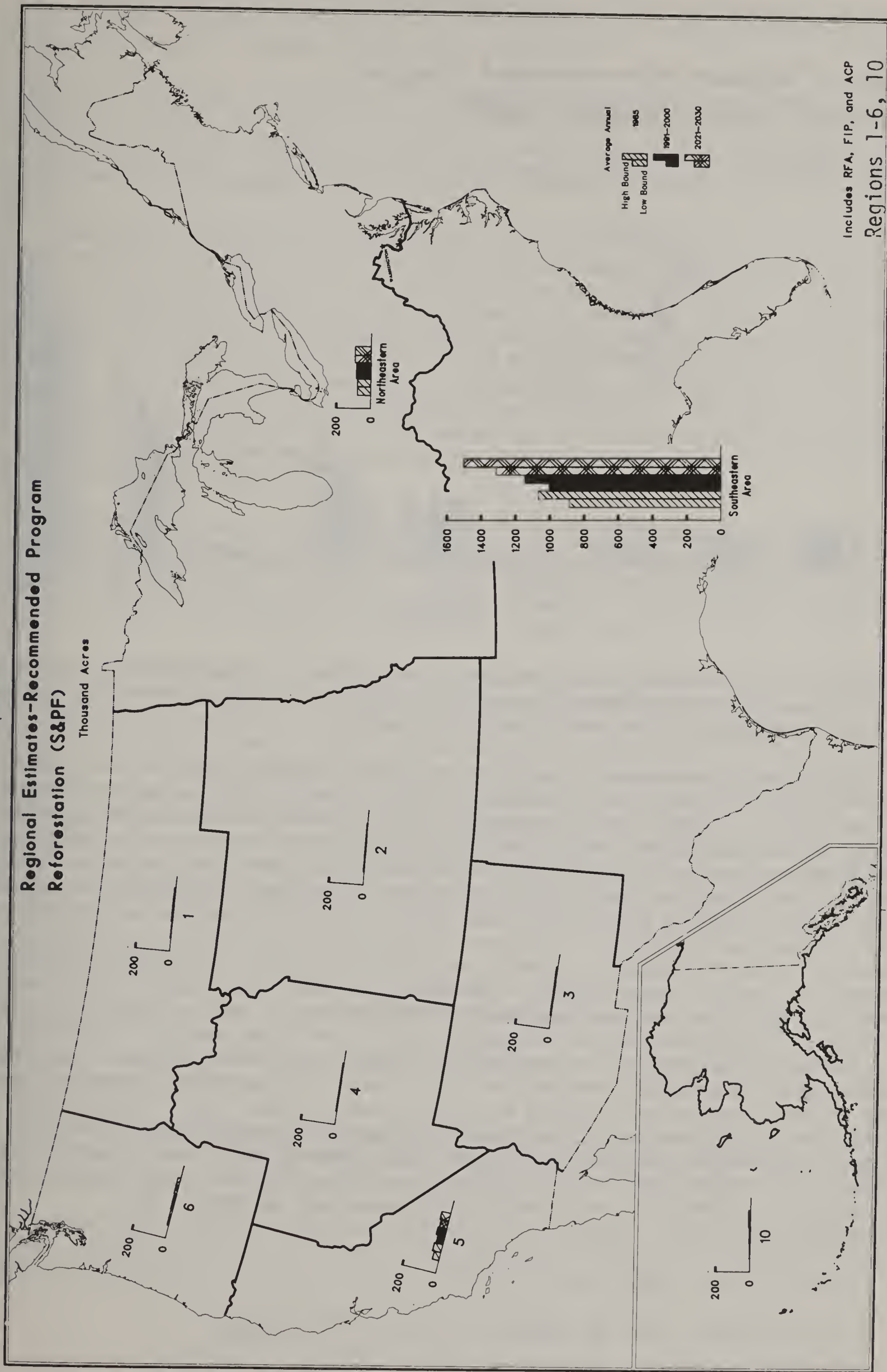
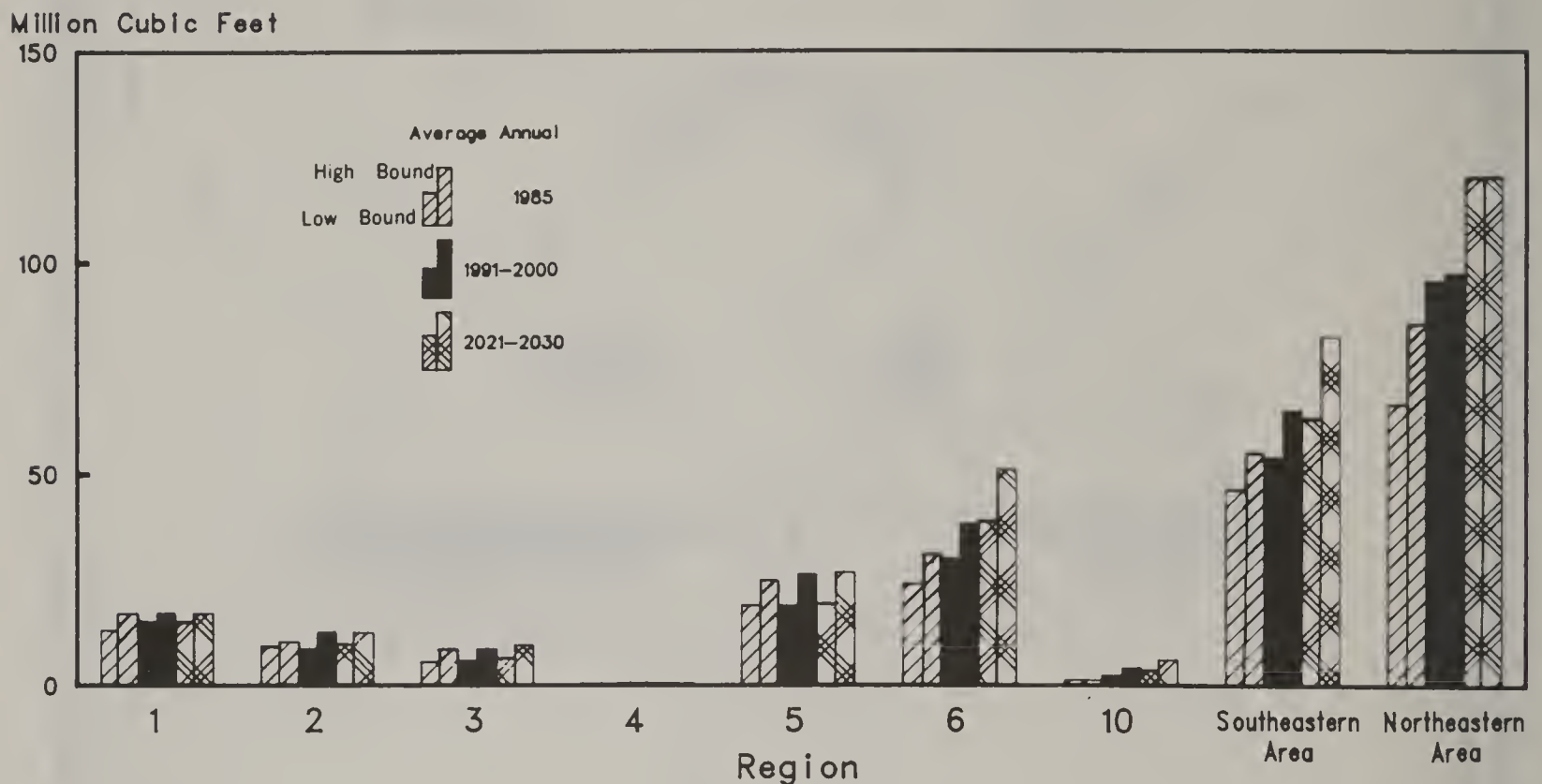


Figure 1.20

Regional Estimates-Recommended Program Improved Wood Utilization (S&PF)



activities in the use of wood for energy production. A special effort will be made to develop and implement a market information and price reporting system that will include both hardwoods and softwoods.

Assistance would be provided through State forestry agencies and financing from Federal and State appropriations, with a majority of the funds provided by the States. State forestry agencies would furnish on-the-ground technical advice and assistance to nonindustrial private forest landowners for reforestation timber stand improvement, and timber harvest. Nurseries and tree improvement programs would be operated by the States to support reforestation efforts. State forest products utilization specialists would furnish on-the-ground technical advice and assistance to loggers and processors to increase the efficiency of wood utilization. Owners requiring additional assistance would be referred to private consultants. The Forest Service would apportion Federal funds to the States and provide general administration and technical support.

Technical assistance to non-Federal forest landowners, loggers, and processors would be provided through the Rural Forestry Assistance program authorized by the Cooperative Forestry Assistance Act of 1978. ^{26/} Cost-sharing assistance for reforestation and timber stand improvement would be provided through the Forestry Incentives Program authorized also by the Cooperative Forestry Assistance Act, and the Agricultural Conservation Program authorized by the Soil Conservation and Domestic Allotment Act of 1936. ^{27/}

^{26/} 92 Stat. 365; 16 U.S.C. 2101.

^{27/} 49 Stat. 1148 as amended; 16 U.S.C. 590 et seq.

The practicality of forestry loan programs and the consistency of tax policies with national timber policies as additional incentives for forest management would be explored with other agencies.

Most technical assistance for harvest, reforestation, and timber stand improvement activities would continue to take place in the South. Additional assistance would be provided in the North and along the Pacific Coast. Most of the improvement in utilization of wood would continue to take place in the East and along the Pacific Coast.

Softwood inventory and annual growth on nonindustrial private forests have made significant gains during the past 25 years. As a result of the strong build up of inventory and growth, there would be opportunities to increase harvesting that could dampen short-run price increases. Technical assistance provided to landowners under the Recommended Program would help realize these opportunities for increased harvest of nonindustrial private forests. A special effort would be made to develop and implement a marketing and price reporting system for softwoods and hardwoods. Utilization assistance to loggers and processors would increase the efficiency of converting softwood timber into useable products and thereby further extend the supply of softwood timber products.

Under the Program, timber sale assistance for landowners and utilization assistance for loggers and processors would help increase the supply of hardwood timber products. Because of increasing supplies, prices should decline slightly in the North in the next decade. However, prices would increase 60 to 80 percent in the South as pulpwood and lumber supplies became tight.

Since forestry is a long-term venture with many years delay in the realization of most management results, additional wood expected to be available as a result of cooperative reforestation and timber stand improvement during the period 1981-2030 would not be available for harvest until 2000-2010; peak outputs from the 1981-2030 investments would occur between 2040 and 2070; and most of the wood could be harvested by 2100. Because the Recommended Program includes substantial emphasis on pine management in the South, the total timber production potential resulting from the Program would increase at both Bounds. During the peak years 2040-2070 the additional volume available for harvest as a result of the cooperative programs would average over 8 billion cubic feet annually.

Research Program

Resource Goals.--Provide new and improved technology both to reduce timber demands and increase supplies through improved harvest and production efficiency, fabrication and recycling technologies, and more efficient use of wood and wood products.

Provide improved technology on residue harvest and delivery systems, fuel plantations, rehabilitation of lands disturbed by mining, and chemical derivatives from biomass used for energy production.

With other nations, develop technology to correct international environmental problems such as acid rain, advancing arid lands, and the loss of tropical forests.

Program Objectives.--Research would provide knowledge to extend the Nation's softwood timber supply to meet increased demands for wood, fiber, and energy. Technology would be developed to improve slash and residue removal and utilization, improve lumber and grade recovery from dead timber, and improve information about allowable stress in softwood lumber and glued structural members. New knowledge and technology would be provided to develop integrated vegetation management methods and strategies.

Improved economical systems for harvesting small trees would be developed for thinning operations and for harvesting small, low-value trees while minimizing logging damage to residual crop trees. Harvesting systems for new short rotation intensively managed stands would be developed.

Information would be developed on the total forest biomass available on commercial forest land and on the use of wood residues as an energy source. Programs would be developed for improved uses of wood and to test the feasibility of whole-tree use in manufacture of composite panels or framing products, and provide a knowledge base for use of hardwood lumber in structural applications.

Research would provide knowledge to better utilize and manage the Nation's hardwood timber supply and to develop the use of hardwood biomass for energy. Technology would be developed to economically harvest and utilize low-quality and small diameter trees as softwood substitutes. Research would provide techniques for increasing the area of hardwood forest that is managed for improved quantity and quality of product. New knowledge about wood energy systems would increase the availability of hardwood for energy.

The results of forest products utilization research would be made available to forest land managers, primary and secondary timber processors, architects, builders, and others who would benefit from the information. This product-related information would assist land managers in establishing plans to protect and maintain forest resources while producing materials to satisfy needs, and would assist others in making the best use of wood products.

Timber management research efforts would focus on basic and applied research on regeneration and culture of major conifer forest types and on management of eastern hardwoods to increase output of wood for fiber and energy while protecting all other multiresource benefits. Management strategies would be developed for intensive timber culture on the best sites, and on custodial and extensive (low investment) management of less productive sites, consistent with recognized protection procedures. Silvicultural management guidelines would be updated for the most important commercial forest tree species.

Research would provide additional information and improved technology to increase planting efficiency and survival of forest regeneration under difficult environmental conditions. Genetically improved planting stock with growth rates 5 to 20 percent higher than average and higher natural resistance to insects and disease would be provided. Advance reforestation techniques to support production of timber and other market goods on public and private ownerships, and new management guides would be developed to enhance nonmarket multiresource values of forests.

Assessment

Demand.--Freshwater withdrawals for all uses were about 339 billion gallons per day in 1975. They are projected to decline to about 306 billion gallons per day by 2000, as a result of water conservation and recycling. In 1975, the distribution of water withdrawals by major uses was:

Irrigation	47 percent
Steam electric cooling	26 percent
Manufacturing	15 percent
Domestic and other	12 percent

Irrigation withdrawals will probably increase for the next 10 years but eventually will decline with adoption of water conserving techniques because of improved technology. Withdrawals for steam, electric cooling and manufacturing will decline as the result of improved technology.

Consumptive uses of water are more critical than water withdrawals. They result in a reduction in the available water supply. Without exception, all consumptive uses of water are expected to increase in the United States. Of the total water consumption in 1975, irrigation accounted for 81 percent; manufacturing, domestic, and commercial uses ranked second with 13 percent.

Supply.--In general, the United States has an abundant supply of water, but there are distribution problems--some areas have too much and others not enough. About 4.2 trillion gallons per day of precipitation falls as rain-fall, snow, sleet, or hail on the conterminous United States. This is equivalent to 30 inches of precipitation per year. Of that amount, about 1.4 trillion gallons per day or about 9 inches of precipitation annually are potentially available for beneficial uses. In the aggregate, this is more than enough water to meet the Nation's needs if it were available where and when needed. However, the distribution is highly variable, ranging from less than 4 inches per year in parts of the Great Basin to more than 200 inches in parts of the Columbia-North Pacific. Substantial water shortages are in prospect in the Great Plains, the Rocky Mountains, the Great Basin, and the Pacific Southwest.

Opportunities for increasing physical supplies include interbasin transfers, desalting, precipitation modification, and vegetation management. The latter relates closely to the opportunities available through forest and range programs.

Water quality.--The tenth annual report of the Council on Environmental Quality (1979) indicates that the Nation is still far from meeting the goal of restoring and maintaining "the chemical, physical and biological integrity of the Nation's waters." Water pollution from point sources occurs in 91 percent of the 246 hydrologic basins identified by the U.S. Environmental Protection Agency. Nonpoint source pollution sources adversely affect water in 87 percent of the basins. The report also indicates that as many as two-thirds of the Nation's lakes may have serious pollution problems.

Most of the water pollution generated as a result of activities on forest and rangelands is from nonpoint sources. Mining, silviculture, construction, and grazing are commonly recognized as the most significant potential contributing activities.

Nonpoint-source pollution is often difficult to identify and measure because it is often not limited to a single source and includes sediment, organic debris, nutrients, and other materials which occur naturally in waters found on forest and rangelands. Detection and control of these types of pollutants are further complicated by the often temporary or seasonal nature of pollutant production in response to natural climatic variations. Other types of pollutants such as introduced chemicals, inorganic wastes, and thermal pollution are more easily identified.

Identification, prevention, and control of nonpoint-source pollution is being addressed in the development of state water quality management programs. Control of water pollution from nonpoint sources can be achieved through a number of techniques including the application of best management practices, and the planning, design, and scheduling of activities on the land.

Point-source pollution is generally incidental to forest and rangelands, but such sources are found in nearly every hydrologic basin and can be significant locally if not controlled. They include sources such as recreational developments, recreational residences, administrative facilities, and processing and storage areas. Pollution from such sources will be abated.

In response to the projected water use demands and in consideration of Forest Service program opportunities that would effectively help meet them, the following Program goals and objectives for water use management, assistance, and research are indicated:

National Forest System Program

Resource Goals.--Provide the technical water support services needed to protect the water resources, to comply with water quality goals as specified in the Clean Water Act, 28/ and to achieve other water resource objectives.

Improve the quality of water not currently meeting the goals of the Clean Water Act.

Provide improvements to increase water yield in water-short areas.

Maintain stream ecosystems as a viable part of the environment.

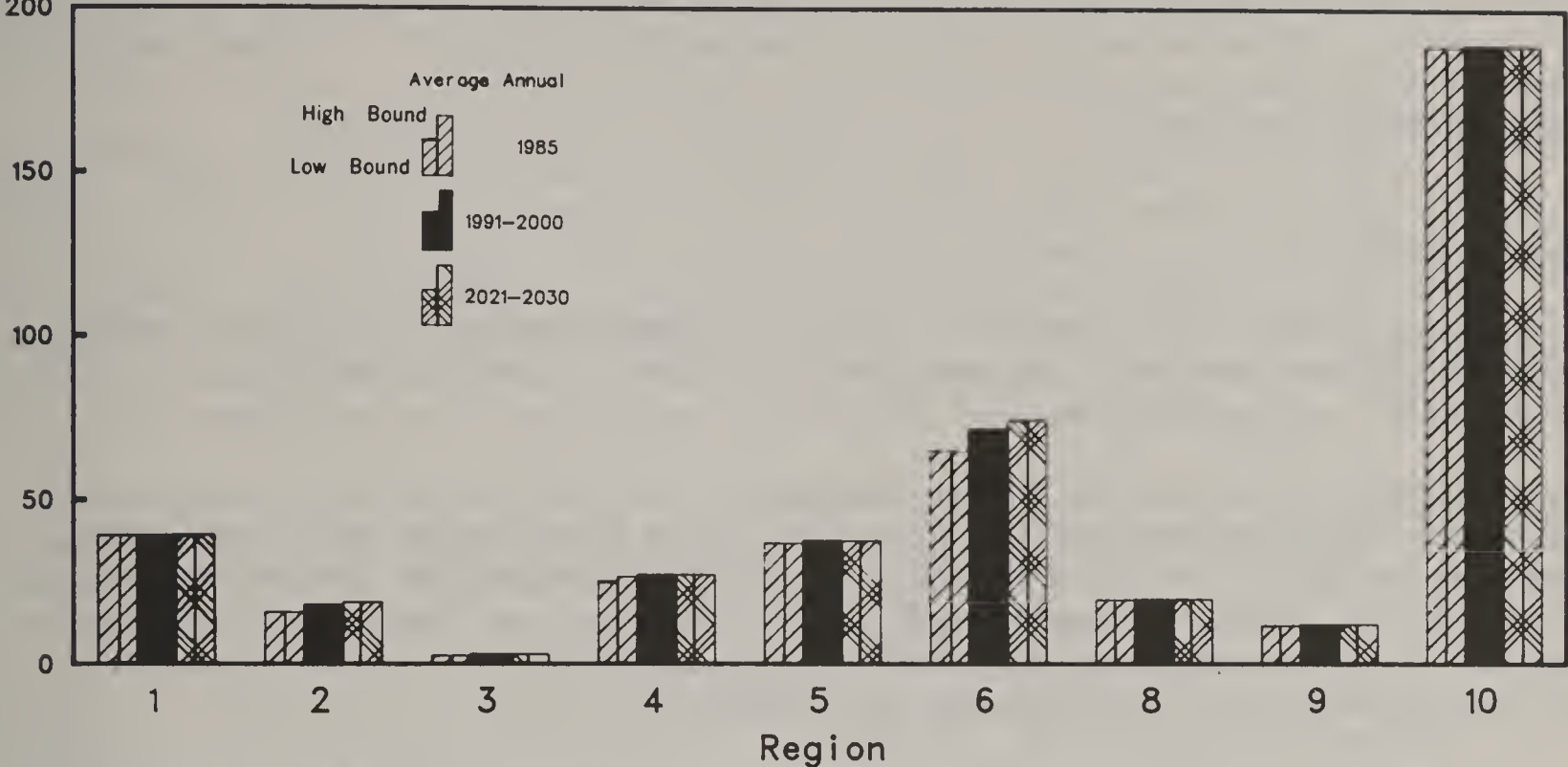
Provide necessary reclamation treatment for mined lands that are degrading water quality.

Program Objectives.--Both the High and Low Bound of the Program include Best Management Practices (see Water Quality discussion on page 111) and measures designed to minimize and/or mitigate effects of timber harvesting, road building, and other land disturbing activities on beneficial uses of water (figure 1.21). The Program also provides the inventory and monitoring of water

28/ Clean Water Act of 1977 (91 Stat. 1566-1611; 33 U.S.C. 1251).

Regional Estimates-Recommended Program Water Quality (NFS)

Million Acre Feet
200



resources, the protection of watersheds and outstanding natural waters, the achievement of water quality goals, and the acquisition of water rights to provide for high level timber, range, and minerals programs. Water quality goals that meet the requirements of the Clean Water Act and recognize quality needs of water supplies would be established in the land management planning process and implemented in the programs.

Impacts of management activities would be monitored to ensure compliance with the water quality and quantity goals established in land management planning. The watershed improvement program provides for the reclamation of degraded areas to return them to a condition where their natural beneficial value may be realized. Further, the Program provides for prompt application of emergency treatment on National Forest System lands necessary to minimize damage to the soil and water resources following wildfire. The High Bound of the Program also would provide for increases in water yield above natural productivity, where economically justifiable and environmentally sound.

State and Private Forestry Program

Resource Goal.--Provide assistance for planning and implementation of water quality and water yield activities through cooperation and involvement with private forest landowners and Federal, State, and local organizations responsible for water.

Program Objectives.--The Program for State and Private Forestry would provide assistance to State forestry agencies for the protection and improvement of quality, quantity, and timing of water yields. Impacts on the water resource

are generally imposed by resource management activities such as grazing, timber harvest, site preparation, mining, and developed recreation. The impact is frequently in the form of soil erosion and sedimentation. Technical and financial assistance would be emphasized in the Northeast and South, with additional assistance in the West. With enactment of the Cooperative Forestry Assistance Act of 1978, the emphasis for the water resource is on application-oriented assistance to supplement planning assistance. Current assistance is largely associated with river basin studies, small watershed planning, Section 208 planning, and occasionally municipal watershed planning. Although some financial assistance is provided by the Forest Service, the assistance is primarily technical advice.

Research Program

Resource Goal.--Provide the scientific knowledge necessary to protect water resources while watersheds are managed for timber, livestock production, wildlife habitat, and recreation.

Program Objectives.--Research would determine the effects of alternative land uses on the quantity and quality of water yields from forest and rangelands. Sediments and nutrients from forest and rangeland watersheds are being evaluated, and the impacts of management activities such as timber cutting, site preparation, and road construction are being measured. Practices would be developed to minimize nonpoint-source pollution.

The impact of acid rain and atmospheric deposition on forest ecosystems would be determined and research on the application of domestic wastes to forest lands would be expanded to include nonsandy soils.

Expanded research would provide new knowledge of riparian zones and the aquatic habitat requirements of fish and wildlife. Methods for improvement and protection of aquatic and riparian habitats would be developed.

Snow management research provides new knowledge for increasing water yields and controlling snow hazards. Technology would be developed to manage snow accumulation and melt to increase soil water resources and water yield. Methods would be developed to control blowing snow and improve avalanche prediction systems to enhance winter recreation and travel and reduce hazards to life and property.

Minerals

Assessment

Demand.--United States demand and production for nearly all minerals has been rising, and these trends are certain to continue (table 1.21). Primary production of coal is expected to be 1.7 billion tons by 2000. Iron ore production is estimated at 129 million long tons in 1985 and 159 million long tons in 2000. Production of nonmetals, such as phosphate rock, sand, gravel, and stone, is expected to roughly double between 1974 and 2000.

In recent years, energy minerals as well as other strategic minerals, have become increasingly important and costly to the Nation's economy. As

worldwide oil and gas supplies become short and demand remains high, the National Forest System will play a growing role in energy supply. The same holds true of strategic hard rock minerals, such as platinum and molybdenum.

More than 95 percent of all oil exploration through 1975 was in relatively small areas on easy-to-develop sites. As it becomes more cost-effective for private industry to explore and produce minerals in rough terrain, the Forest Service will become increasingly involved in matters affecting mineral supply and demand.

Supply.--Coal reserves are about equal East and West of the 100th meridian. Generally, eastern coal is privately owned, whereas the Federal Government owns 60 percent of western coal. Federal coal under western forest and rangelands will supply much of the projected demand. Most of the increase in phosphate rock production is expected to come from Federal forest and rangelands in Idaho, Wyoming, Utah, and Montana. Most of the production of the other nonmetals is expected to come from private forest and rangelands, and this production will be widely distributed geographically.

Currently, the United States consumes about 19 million barrels of petroleum a day and produces about 8.5 million barrels. Daily free-world petroleum production is about 50 million barrels. Presently the lands administered by the National Forest System contribute about 30,000 barrels a day, or about 15 percent of the oil production from Federal lands (excludes naval reserves or offshore production). Lands administered by the Bureau of Land Management produce about 85 percent of the oil from Federal lands (excludes naval

Table 1.21.--Illustrative primary mineral production comparisons in the United States by class of mineral, 1974 with projections to 1985 and 2000

Class of mineral	Base	Projections	
	1974	1985	2000
		(thousand tons)	
Fuels:			
Coals:			
Anthracite	7,000	6,000	6,000
Bituminous and lignite	603,000	993,000	1,655,000
Uranium (nuclear)	10	36	60
Metals:			
Copper	1,597	2,500	3,800
Iron ore	91,840	128,800	159,040
Nonmetals:			
Clays	61,000	100,000	190,000
Phosphate rock	45,686	80,000	85,000
Sand and gravel	978,000	1,390,000	2,090,000
Stone, crushed	1,042,000	1,550,000	2,500,000

Source: Table 2.11, 1979 RPA Assessment.

reserves or offshore production). Recent leasing activity on National Forests indicates that the National Forest System contribution could increase dramatically through the next 20 years.

In response to the projected demands for minerals and in consideration of Forest Service program opportunities that would effectively help meet them, the following Program goals and objectives for minerals use management, assistance, and research are indicated:

National Forest System Program

Resource Goal.--Complete processing activities on minerals proposals in a timely manner. Fully integrate proposals and resulting activities with other resource plans and needs. Give priority to proposals relating to energy minerals.

Program Objectives.--The objectives of the Program for minerals management would make available to the national economy the extensive mineral and energy resources of the National Forest System; facilitate exploration of mineral resources; protect surface resources during mineral exploration, development, and production; and require appropriate reclamation following completion of operations.

The High Bound of the Program would provide for prompt processing of the large numbers of expected mineral lease and permit applications and the large numbers of operating plans (figure 1.22). The numbers of processed operating plans would increase from 20,000 in 1982 to 24,000 in 1985 and 38,000 in 2025. At the Low Bound, processing of operating plans would increase to 20,000 in 1985, and rise to 31,000 in 2025. Based on existing trends brought about by the energy crisis, the Low Bound of the Program would cause a backlog of unprocessed leases and operating plans which would result in less energy being produced from NFS lands. In fact, it is likely that even the High Bound of the Program would result in some unprocessed leases and operating plans.

Average cost, on a nationwide basis, for the production of an operating plan by the Forest Service for a lease or claim is \$1,250. An operating plan for removal of gravel and other common materials costs about \$600 to prepare.

National Forest System mineral activity is reported in two ways: (1) in terms of numbers of operating plans developed and administered, and (2) in terms of actual production (tons and BTU's). Operating plans are surface management plans governing development of minerals on the National Forest System. Prompt handling of well-designed operating plans is a top priority for the Forest Service.

Three types of mineral disposals are covered in operating plans:

- (1) locatables (claims covering hard rocks minerals such as gold, silver, lead, zinc, etc.);
- (2) leasables (energy minerals such as oil, gas, geothermal, coal and oil shale); and
- (3) salables (such as gravel, building rock, etc.).

The Northern, Rocky Mountain, Southwestern, Intermountain, Southern, and Eastern Regions have energy minerals programs that are very cost-effective. The Northern, Rocky Mountain, Intermountain, and Pacific Southwest Regions have important hard-rock minerals. The Pacific Southwest, Pacific Northwest, and Alaska Regions have significant salable minerals. The Intermountain, Southern, and Eastern Regions have important leasable minerals.

Public response to the draft alternatives indicated a high concern about critical reliance on imported fuels. There was also sentiment favoring greater Forest Service involvement in research and development to protect, restore, and rehabilitate lands disturbed by surface mining activities. The Program is responsive to:

1. The expected increase in demand for minerals resources located on lands administered by the Forest Service.
2. The need for continued research and development related to minerals management.
3. The need to accelerate withdrawal review process, giving priority to those lands with high minerals potential.
4. The need to modify the U.S. Mining Laws of 1872. 29/

Interagency coordination among the Forest Service, the Bureau of Land Management, the U.S. Geological Survey, and the Department of Energy is an important facet of the Recommended Program. A Memorandum of Understanding exists between the Forest Service and the Bureau of Land Management relating to timing and coordination of the Federal Coal Management Program. An agreement also exists between the Forest Service and the U.S. Geological Survey covering the sharing of data and information.

The minerals program must be implemented promptly to most effectively respond to national energy and strategic minerals needs.

State and Private Forestry Program

Resource Goal.--Provide assistance to States and private landowners for planning related to mineral operations and for reclamation of disturbed lands.

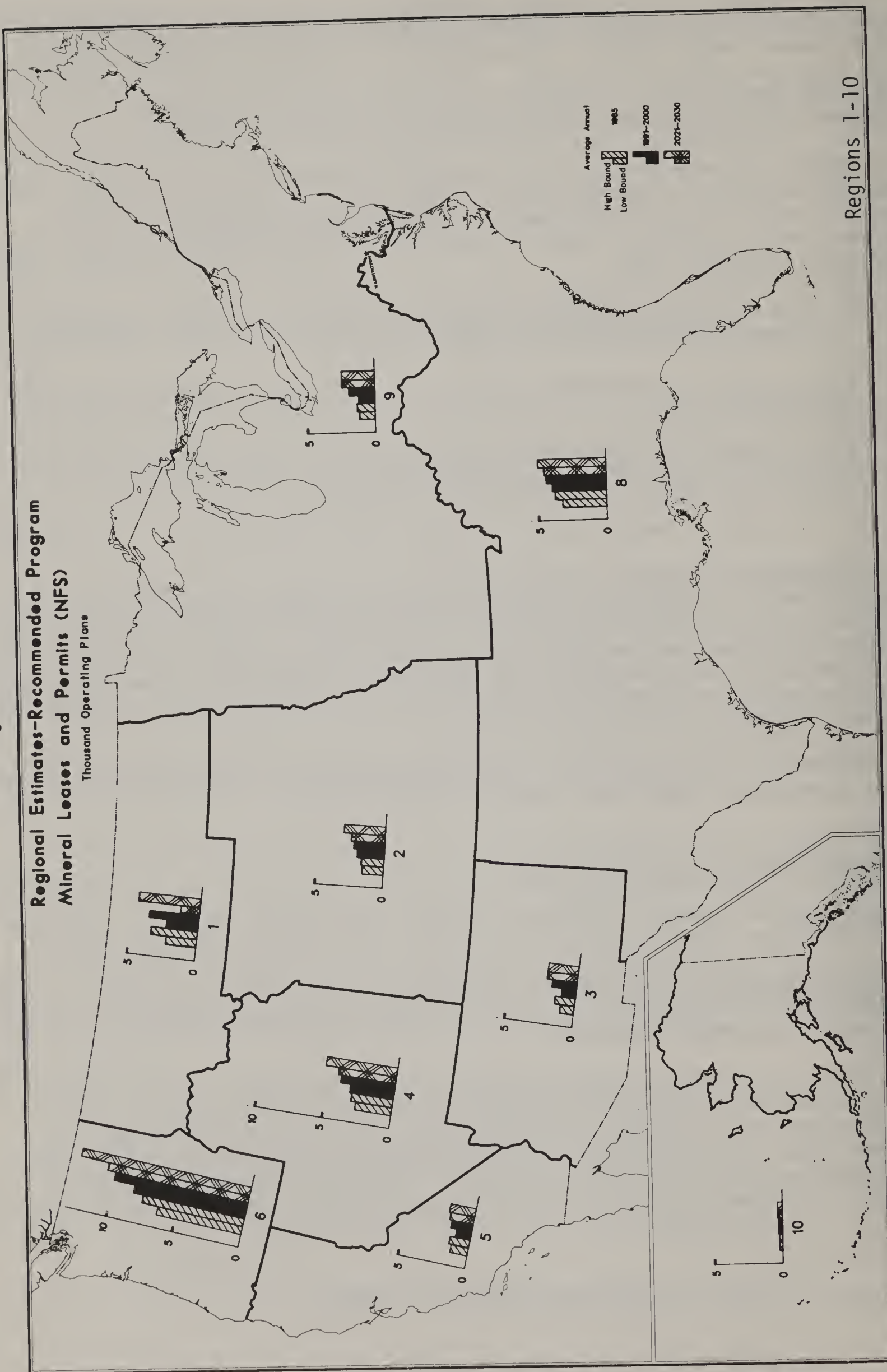
Program Objectives.--The Program for State and Private Forestry would provide technical and financial assistance for minerals activities primarily in the Northeast, South, and Southwest.

Minerals activities would be directed primarily toward reestablishment of forest cover on forested land affected by surface mining. The assistance would be applied to current mining operations and to previously mined, unreclaimed land. In cooperation with USDI Office of Surface Mining, USDA Soil Conservation Service and State mining and reclamation regulatory agencies, forestry assistance would be provided in carrying out provisions of the Surface

29/ 17 Stat. 91, as amended; 30 U.S.C. 22-47.

Figure 1.22

Regional Estimates-Recommended Program Mineral Leases and Permits (NFS) Thousand Operating Plans



Regions 1-10

Mining Control and Reclamation Act of 1977 30/. Technical assistance would be given to States for production of tree seedlings for reclamation, including genetic improvement of planting stock to meet special reclamation requirements.

Research Program

Resource Goal.--Provide technology that is more cost-effective in developing mineral resources, minimizes environmental impacts, and rehabilitates disturbed lands to full productivity.

Program Objectives.--Rehabilitation research would provide technology to meet environmental concerns more effectively while permitting exploration, development, and use of mineral resources. Thus, it would support efforts to substitute coal and would evaluate the chemical and physical properties of spoil, mine waste, and tailings, identify potential pollutants, and develop techniques for revegetation so that erosion can be minimized and streamflow water quality standards met. Associated undisturbed ecosystems and sites of ecological significance will be identified and techniques developed for their protection.

Human and Community Development

Human and Community Development crosses all organizational lines within the Forest Service, involving the National Forest System, State and Private Forestry, and Research in three major types of activities:

Human Resource Programs (i.e., Young Adult Conservation Corps, Youth Conservation Corps, Job Corps, and Senior Community Service Employment) provide employment, skills training, experience, and education for the unemployed, underemployed, minorities, economically disadvantaged, youth and the elderly through a unique and successful blending of human and natural resources. These programs contribute significantly to the improvement of public facilities and the management of public forest and rangelands. In addition to the programs providing formalized training and compensation, the Forest Service conducts the Volunteers in the National Forests Program, which provides opportunities for an unlimited number of persons to contribute their talents and knowledge to enhance the National Forest System and serves as a host agency for cooperative programs administered by State and local governments.

Urban and Community Forestry activities involve both research and technical assistance to States for the establishment, management, and protection of trees and forests in urban areas and rural communities.

Organization Management Assistance provides consultations and technical assistance to State forestry agencies on a variety of organizational and administrative matters. These are designed, on request from the State, to improve the efficiency and effectiveness of cooperative forestry programs.

Since Human and Community Development activities do not fit neatly into the National Forest System, State and Private Forestry/Research format used elsewhere in this chapter, a format using the three major items discussed above is presented. Related activities, discussed in the section on

30/ 91 Stat. 445; 30 U.S.C. 1201.

protection, are the Rural Community Fire Protection Program designed to better organize, train, and equip volunteer fire departments in rural areas, and Cooperative Law Enforcement which provides funding for States and local jurisdictions to enforce State and local laws as they relate to the public and their property on the National Forests. Program goals and objectives for human and community development programs, assistance, and research are discussed below:

Human Resource Program

Resource Goal.--Continue to support and participate in employment and training programs for youths, older Americans, and the disadvantaged in response to national employment and training needs and opportunities existing in forestry.

Program Objectives.--At the High Bound, all but one of Human Resource Programs would increase; the Youth Conservation Corps would be held at its maximum authorization. Numbers of enrollees would increase while the fiscal year 1978 staffing level would be maintained. There would be an increase in funding for State and local government grant programs. In addition, the Human Resource Programs Staff would aid local authorities in setting up human resource programs and would encourage cooperative agreements. Research would continue to participate in selected human resource programs by employing enrollees. At the Low Bound, the YCC program would be reduced each year until 1983, after which it would be terminated. The other programs would be retained.

Urban and Community Forestry

Resource Goals.--Provide technical expertise and guidance to State forestry agencies for urban and community forestry.

Assess the benefits that can be obtained from urban and community forests; understand the biological and physical processes through which urban forests produce these benefits; design efficient systems to maintain, protect, and manage urban forest resources; and develop ways to integrate urban forest management with the overall urban planning and development process.

Program Objectives.--Financial assistance to States for urban forestry would not be provided because urban programs are authorized and funded by other Federal legislation and Departments. State and local governments can request funds for urban forestry programs under these authorities within their own established priorities. The High Bound of the Program would support the continuation of Forest Service coordination and technical advice in urban forestry. Guidance and liaison would be provided to State forestry agencies to assist with their urban and community forestry programs. At the Low Bound, urban forestry assistance would be eliminated. Pilot testing of promising research results, demonstrations, and special projects such as development of information retrieval systems would be provided through the technology implementation program.

Research would determine how trees influence urban property values and evaluate ways in which vegetation can be used to reduce energy costs associated with home heating and cooling. Systems would be defined to plant, grow, improve, protect, and maintain urban forest resources. Other important research efforts would focus on finding new or better ways to use urban forest

vegetation to enhance air quality, reduce noise, help stabilize soil, improve water quality, and enhance wildlife habitat.

Research on the influence of tree configurations on wind movements would provide guidelines for planting of shelterbelts to preserve environmental values in rural settings, and to guide urban forest vegetation management programs directed toward improving the urban climate.

Organization Management Assistance

Resource Goals.--Technical assistance and consultations would be provided on request to State forestry agencies in such areas of concern as: organization and staffing, workload analysis and work planning, program evaluation, personnel systems, safety, information and education, automatic data processing applications, and other administrative and managerial systems and procedures as needed.

Program Objectives.--Approximately 200 assists per year would be provided. Contractor consultants would be utilized for instructor training, training in managerial principles, and other types of specialized assistance.

Highest priority would be placed on assistance that would result in strong organizations and managerial systems needed to meet the goals set forth in State forest resource programs. Second priority would be to encourage adoption of results-oriented managerial philosophies and systems by recipients of cooperative forestry funds.

Organization management assistance contributes to the achievement of targeted outputs by organizations receiving cooperative assistance. Studies of organizations that have adopted modern managerial technologies indicate that productivity improvement of up to 40 percent is possible, with improvements of 10 to 25 percent common. The result is more effective use of both Federal and State funds.

Protection

The protection support element includes activities that benefit all resources. Its activities provide for prevention and control of insects, diseases, and wildfires on National Forest System lands as well as public and private forest and rangelands. Program goals and objectives for fire and insect and disease protection, assistance, and research are outlined below. Law enforcement and other aspects of resource and community protection are included.

National Forest System Program

Support Element Goals.--Provide cost-effective insect and disease management, fire control, and law-enforcement activities to reduce resource losses and to enhance and maintain resource productivity.

Provide cost-effective air quality management, with emphasis on studying and managing air quality related values and emission from management activities.

Program Objectives.--About 12,000 fires per year occur on National Forest System lands. Half are caused by people, the rest by lightning.

Protection from fire and the use of fire are provided in the protection element to reduce resource losses and maintain resource productivity (figure 1.23). Fire programs at both Bounds are commensurate with the level of resource activity. The specific targets of wildland fuel treatment and smoke management remain in compliance with regulations at both Bounds of the Program (figure 1.24).

In 1978, the fire management policy for National Forests was changed to meet three objectives:

1. Provide a balanced fire control program that is cost-effective in preventing or reducing threats to life and property, and supports achievement of resource output targets.
2. Use prescribed fire to protect, maintain, and enhance productivity of National Forest resources.
3. Provide data, information, and coordination for full integration of fire use and protection in the development, analysis, and evaluation of alternative land management prescriptions, goals, and objectives.

Recognizing that some fires can help shape desirable ecological balances, the Forest Service would continue to prescribe as well as control fire to provide efficient fire protection while contributing to resource management objectives. Fire can be useful in controlling tree diseases, creating more browse for deer and other wildlife, preparing brushland for tree planting, improving range forage, reducing the threat of wildfire to other resource values or to people, or releasing young timber stands from vegetative competition. Fire management activities specifically intended for resource enhancement are provided for through activities within the benefiting resource element rather than the support element.

The Clean Air Act 31/ requires Federal land managers to take affirmative action to protect the air quality-related values (including visibility) of all Class I lands under their jurisdiction. It also requires Federal land managers to determine whether new pollutant sources may adversely affect air quality-related values of Class I areas. The Act states a national goal of preventing any future impairment of visibility in Mandatory Class I areas and the remedying of existing impairment. The Forest Service is the Federal land manager for 88 Mandatory Class I areas, and consequently must implement requirements of the Clean Air Act at both Program Bounds. Smoke management programs are employed to reduce the impacts of prescribed burning on designated smoke management areas.

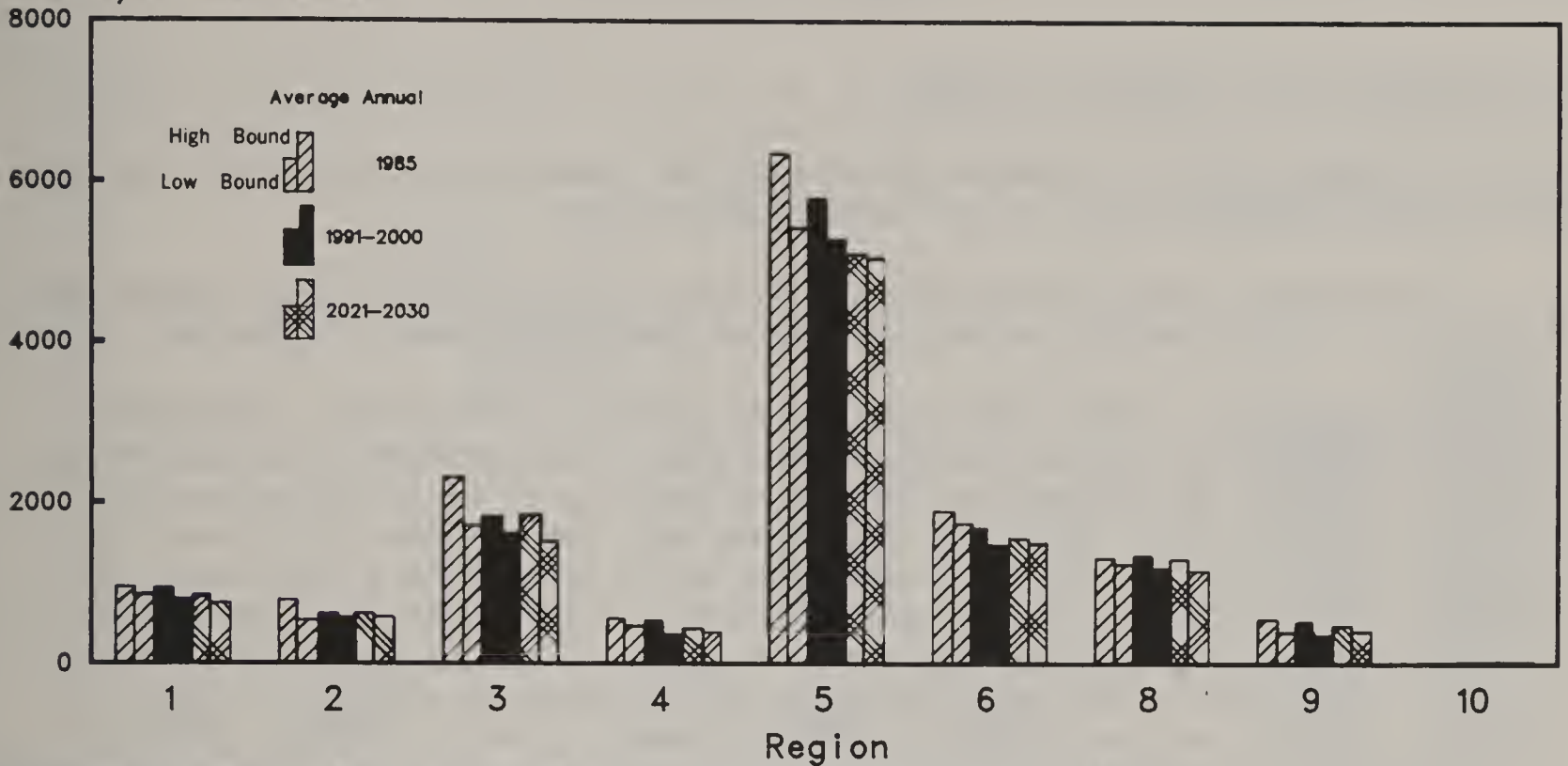
The Cooperative Law Enforcement Program recognizes the economic burden of law-enforcement services to local government that high volumes of visitors create in rural areas. Since the visitors do not generally generate local tax revenues, this program would provide economic assistance to help offset the law-enforcement costs to local jurisdictions within the National Forests.

31/ 91 Stat. 685, as amended; 42 U.S.C. 7401 et seq.

Figure 1.23

Regional Estimates-Recommended Program Fire Management Effectiveness Index (NFS)

Dollars/Thousand Acres

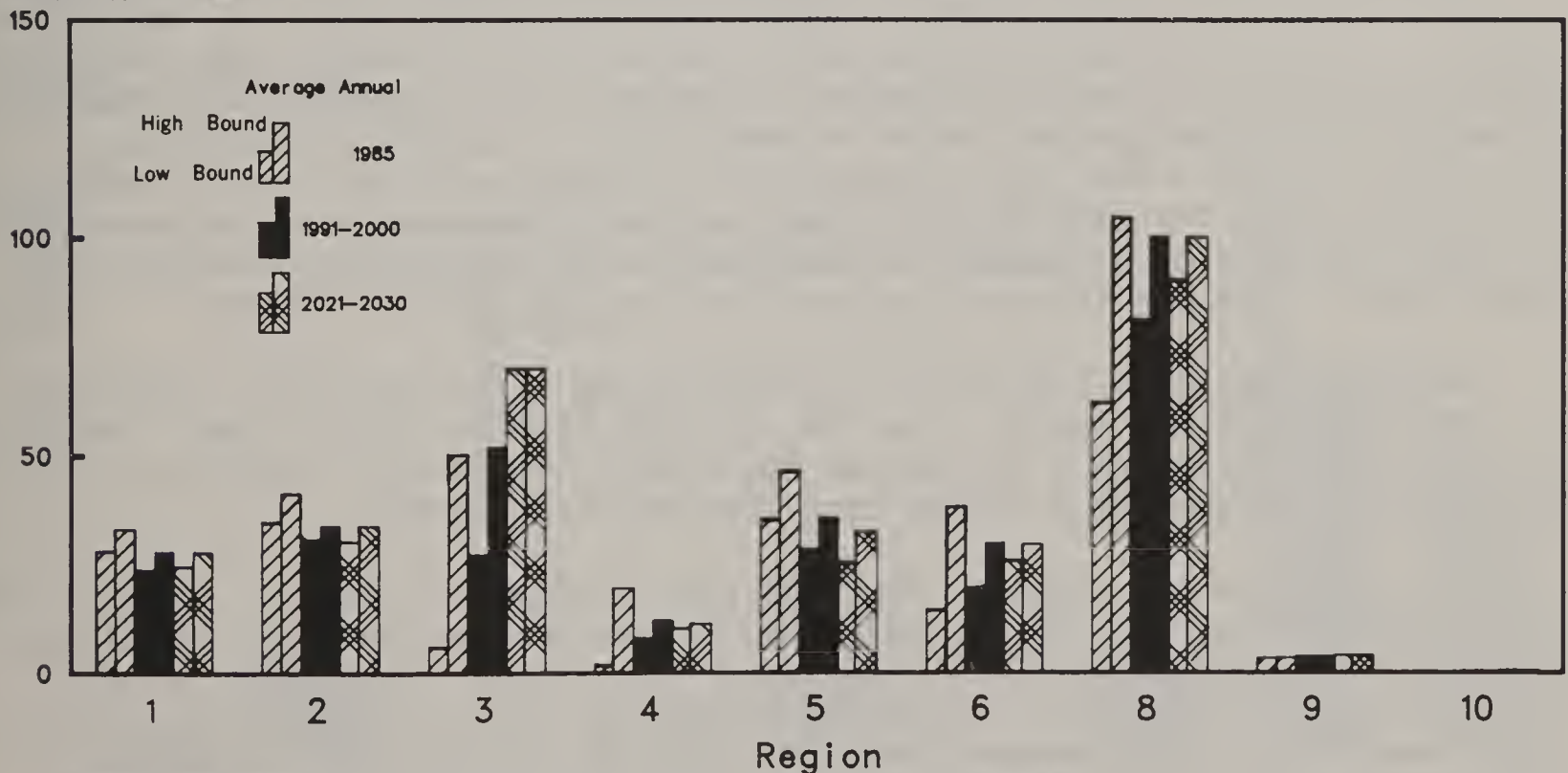


Fire Management Effectiveness Index Is a Measure of Cost Plus Loss

Figure 1.24

Regional Estimates-Recommended Program Fuelbreaks and Fuel Treatment (NFS)

Thousand Acres



Includes Fuelbreak Construction and Treatment of Natural Fuels.
Excludes Treatment of Activity Fuels.

During FY 1980, 472 of 750 eligible counties were engaged in the Cooperative Law Enforcement Program.

Where agreements have been made it is anticipated that the Cooperative Law Enforcement Program would be proposed at a funding level consistent with the actual growth in use of the National Forests.

State and Private Forestry Program

Support Element Goals.--Provide assistance for rural fire prevention and control on non-Federal lands and in rural communities.

Provide assistance for insect and disease control within all forest and rangeland. Emphasize the use of integrated pest management strategies.

Program Objectives.--Under the Program, financial and technical assistance would be provided to improve rural communities' fire protection capabilities (figure 1.25) and to reduce fire losses through rural fire prevention and control (figure 1.26). Both the High Bound and the Low Bound for rural fire prevention and control rise from the same level in 1981 to a constant and identical level later in the planning period. The High Bound rises gradually after 1981 and reaches a constant level in 1985. The Low Bound remains at the 1981 level until 1985 and then rises to the High Bound level by 1995.

During the first 2 years, the Federal role in rural fire protection would be analyzed, and appropriate Federal-State cost-sharing relationships would be determined. Because fire risks and hazards are difficult to foresee, they would be evaluated continuously. Federal funds would be directed to the most cost-effective opportunities as revealed by these evaluations. However, the State roles would be dominant. Improved protection of rural communities through organization, training, and equipping volunteer fire fighters is a key part of the Recommended Program. Effective use of excess Federal property (trucks, tankers, etc.) is included.

Although most of the financial contribution to rural fire prevention and control is from the States, Federal participation and coordination facilitates transfer of firefighting resources among States in emergencies. No single agency on its own can justify efforts to prepare for an extreme fire emergency. Serious wildfire emergencies occur in some areas of the Nation each year. Appropriate Federal planning and backup assistance would help permit mobilization of resources for dealing with these regional emergencies. The sharing of State firefighting personnel and equipment with the National Forests and other Federal agencies further supports this successful partnership.

Insect and disease control at the High Bound rises gradually from 1981. The Low Bound does not change from 1981 through 1985 but then rises. The restraint in the early years of the Low Bound would implement integrated pest management techniques at a slower rate than the High Bound.

The Program would provide financial and technical assistance to State forestry organizations and local governments to develop new and more intensive management strategies to reduce the losses from insect and disease attacks on forest resources. State leadership capacities would be developed in forest insect and disease management initiatives such as protection of urban trees and forests, protection of wood in use, prevention of pest losses through

Figure 1.25

Regional Estimates-Recommended Program Rural Community Fire Protection (S&PF)

Thousand Approved Applications

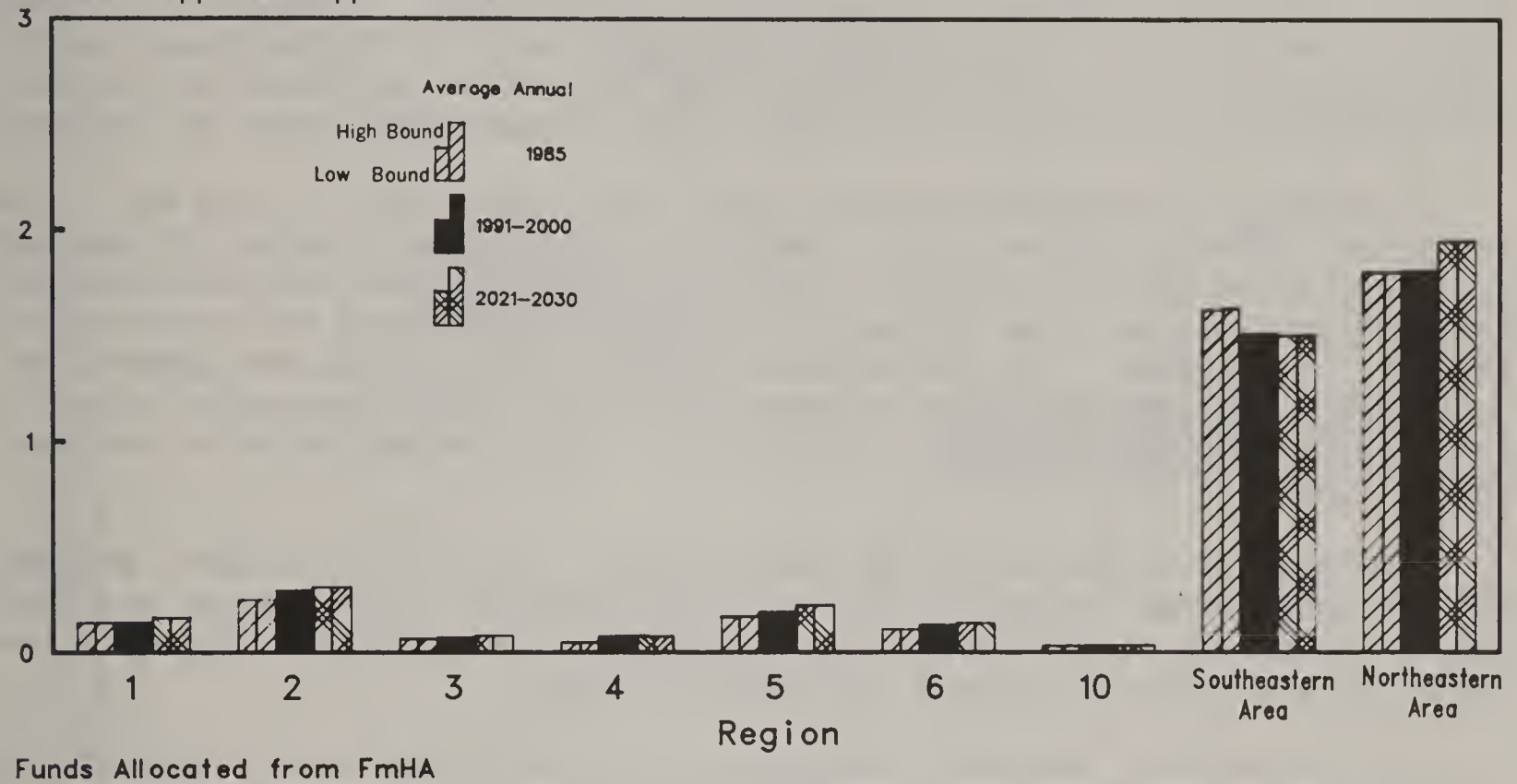
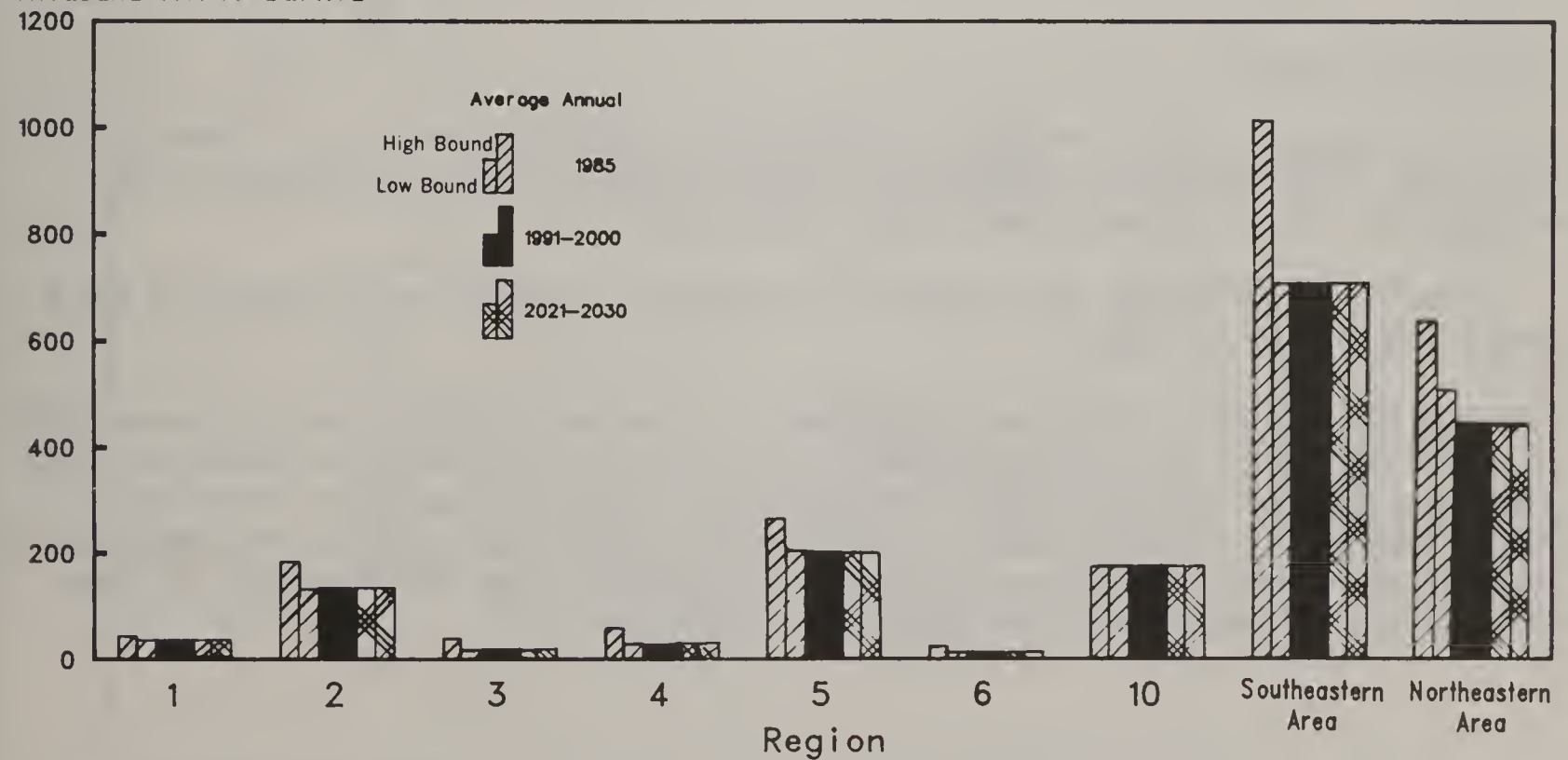


Figure 1.26

Regional Estimates-Recommended Program Fire Loss on Protected Area (S&PF)

Thousand Acres Burned



and forests, protection of wood in use, prevention of pest losses through planning and management practices, and protection of forest resources of the nonindustrial private landowner.

Prevention, detection, and control of insect and disease pests on National Forests and other Federal lands would be carried out directly or in cooperation with the land managing agency. There would be nationwide emphasis on integrated pest management strategies that are cost-effective and that rely less on chemicals to control major insects and diseases. Integrated strategies would be initiated for spruce budworm and gypsy moth in the Northeast, western spruce budworm in the Pacific Northwest and Southwest, bark beetles in the South and West, and Douglas-fir tussock moth and dwarf mistletoe in the West.

Prevention strategies against insect and disease attack would be initiated on National Forest System lands, especially silvicultural control of mountain pine beetle and dwarf mistletoe in the West. Other control methods--mechanical, cultural, manual, and biological--would be implemented for other major insects and diseases. The Recommended Program also provides for continuing early detection and evaluation surveys to minimize forest resource losses from destructive forest pests (figure 1.27). Early detection often reduces control costs.

New special projects such as demonstration areas, pilot control projects, and loss assessment projects would be established for major insects and diseases, especially in the Pacific Northwest, Northern, and Rocky Mountain Regions and the Northeastern and Southeastern Areas.

As new problems develop, technical and financial assistance would be provided to State and other local agencies to develop alternative management strategies to minimize insect and disease impacts on the forest resources in State and private ownerships. Pesticide-use management and coordination activities would be accelerated.

New information, new and improved techniques developed by the expanded USDA research and application programs, and other research findings would be disseminated to user groups through publications, training, demonstration areas, and direct involvement in the land management planning process.

Research Program

Support Element Goals.--Provide technology to reduce the cost of fires by improving fire behavior prediction, fuel treatment, and knowledge of the effects of fire on forest and range ecosystems.

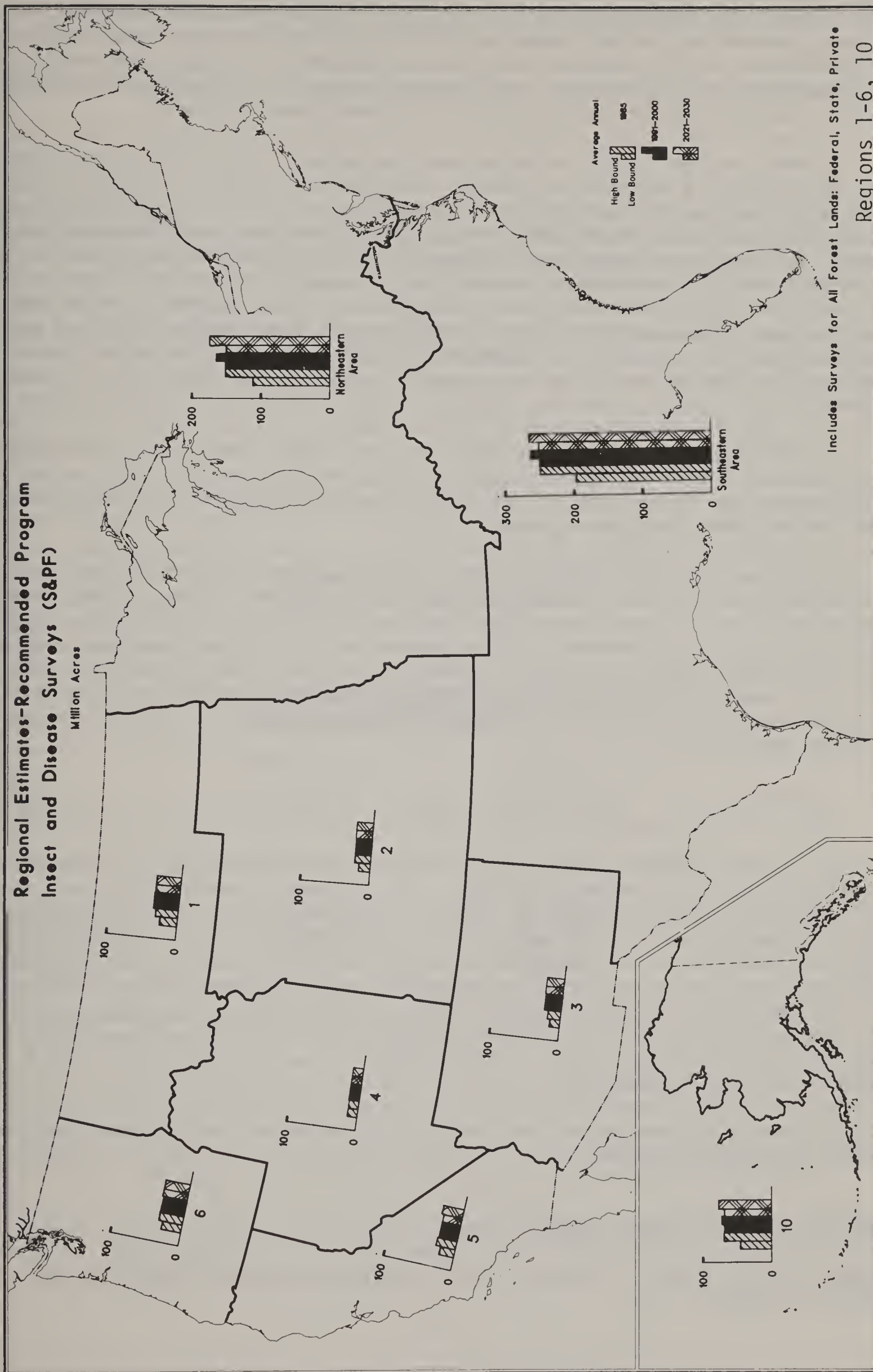
Provide technology for reducing impact of diseases and insects on both trees and timber in use.

Program Objectives.--Fire and atmospheric sciences research would concentrate on reducing costs of fire management by developing better fire behavior predictions, better meteorological and fire economics information, and more effective fuel treatment and fire prevention techniques. This research would provide management with more accurate and longer range assessments of fire effects and alternative fire management techniques.

Figure 1.27

Regional Estimates-Recommended Program Insect and Disease Surveys (S&PF)

Million Acres



Includes Surveys for All Forest Lands: Federal, State, Private
Regions 1-6, 10

Forest insect and disease research would include current programs on identifying and assessing impacts of insects and diseases and determining the biology, and ecology of the most destructive pests. Research would be redirected in response to crisis situations. Research also would stress the development of safe biological and chemical controls. Adequate data bases would be maintained for evaluation of pest management systems.

Planned research would provide new knowledge for alternative pest management strategies to prevent or suppress diseases and insects. Building upon existing knowledge of host-pest ecology and prevention and suppression methods, integrated pest management (IPM) strategies and systems would be developed for control of selected diseases and insects. Although IPM has long been a Forest Service objective, additional research would speed development of IPM techniques for the larch casebearer, introduced pine sawfly, termites, wood decay, cone and seed diseases and insects, the mountain pine beetle, fusiform rust disease, dwarf mistletoe, and regeneration pests of ponderosa pine. An integral part of IPM is vegetation management, which is included in the timber element.

As IPM strategies for these pests are developed, other pests such as diseases and insects of range plants would be emphasized and IPM strategies would become the foundation of resource protection systems as adequate knowledge was acquired through research.

Additional research would produce new knowledge to improve fire and smoke management guidelines. Technology would be developed to manage smoke from prescribed fire on forest and other land, and guidelines will be developed for meeting air quality standards. Fire prevention strategies developed during the past decade would be further refined and tested, the role of controlled fire as a substitute for herbicides would be determined, and prescribed fire as an alternative to wildfire in maintaining desirable ecological processes would be evaluated.

Lands

The lands support element includes activities necessary to maintain and facilitate outputs of other resources. This element provides for land management planning, administration of special land uses (except for recreation-related special uses), land ownership and adjustments, title claims, occupancy trespass, transfer of administrative jurisdictions, property line surveys, and multiresource studies of existing National Forest Systems land and new areas. It includes State forestry resource planning assistance. Research provides new knowledge for improving multiresource surveys and economic analyses, and planning for alternative uses for non-Federal as well as National Forest Systems forest and rangelands.

Program goals and objectives for lands management, assistance, and research are outlined below:

National Forest System Program

Support Element Goals.--Intensify land resource management planning and related special studies.

Increase flexibility and efficiency of land management and reduce risk of trespass through land exchange, transfers, acquisition, adequate landline location and marking, and resolution of title claims. Complete and maintain a land status data system to meet management planning and program commitments. Facilitate early completion of Native and State land selections in Alaska.

Plan and provide for special uses of National Forest System land.

Program Objectives.--At the High Bound of the Program, land and resource planning and related special studies would be accelerated to complete National Forest System plans ahead of the October 1985 requirement of the NFMA. The planning would be accelerated, particularly in the eastern National Forests, and as needed elsewhere. At the Low Bound, land and resource planning and related special studies would be completed by the mandatory 1985 date. Planning would be held to that consistent with a low level resource development program through 1985, then progressively increased. Both Bounds of the Program would provide for initial concentration of planning efforts on National Forests which have a large inventory of old-growth softwood suitable for home construction.

Landline location, marking, and status at the High Bound would be sufficient to support planned levels of resource output and to discourage new trespass and resolve current cases. At the Low Bound, landline location, marking, and status would be held at the minimum level needed to support a low level of resource outputs. The landline location backlog, 114,000 miles, would be eliminated by 2000 (table 1.22) under either program.

Table 1.22.--Forest Service schedule for reducing the landline location backlog

Period	Backlog at start of period	Total scheduled for period	Average per year
		(miles)	
1981-1985	114,000	15,595	3,119
1986-1990	98,405	40,350	8,070
1990-2000	58,055	58,055	5,805
2000-	-0-	-0-	-0-

Title claims work at the High Bound would resolve title conflicts revealed during development of private lands and during more intensive management of National Forest System lands. Land status work would provide information needed to support the increased activity anticipated on both public and private lands. At the Low Bound title claims activity would be minimal.

Land purchases using Land and Water Conservation Funds would be at a high level until the Program ends in 1989 under both Bounds of the Program. At the

High Bound, land purchases using regular Weeks Act ^{32/} funding would begin at a low level and increase. The private land that would be acquired in the eastern National Forests is needed to improve manageability (figure 1.28). At the Low Bound, Weeks Act land purchases would be at a minimal level to acquire only the most critically needed parcels, leaving the proportion of Federal ownership in eastern National Forests much below the optimum for efficient management.

The Forest Service would continue to acquire lands suitable for recreational development and accessible to urban areas at the High Bound. It would also acquire lands in congressionally designated areas, and those needed for watershed protection. Land exchanges and land adjustments would focus on gaining the efficiencies of improved land ownership patterns through various easements and adjustments with adjacent ownerships. At the Low Bound, land exchanges and adjustments would be sufficient only to resolve the most critical land ownership problems. In general the Forest Service would seek the most cost-effective land use changes or adjustments to achieve management objectives and efficiency.

Native and State land selections related to National Forest System lands in Alaska would be planned for rapid completion.

State and Private Forestry Program

Support Element Goals.--Provide technical land management assistance to private forest landowners. Increase the preparation of individual private landowner forest management plans to 400,000 a year by 1985 through efforts of State forestry organizations, consulting foresters and others.

Provide assistance to States for State forest resource planning.

Provide special assistance to Alaska as large acreages are transferred from Federal to State and private ownerships over the next decade.

Program Objectives.--The Program would provide assistance to States for State forest resource planning (figure 1.29).

State forest resource planning requires expertise that is lacking on the State Forester's staff in some States. The Program would assist those State Foresters in obtaining the necessary expertise.

The outputs from planning include increased organizational efficiency gained by focusing activities on recognized goals and objectives. Ultimately, planning is reflected in outputs of goods and services. At the present time no accepted factors exist for relating such plans to specific quantities of increased outputs of goods and services.

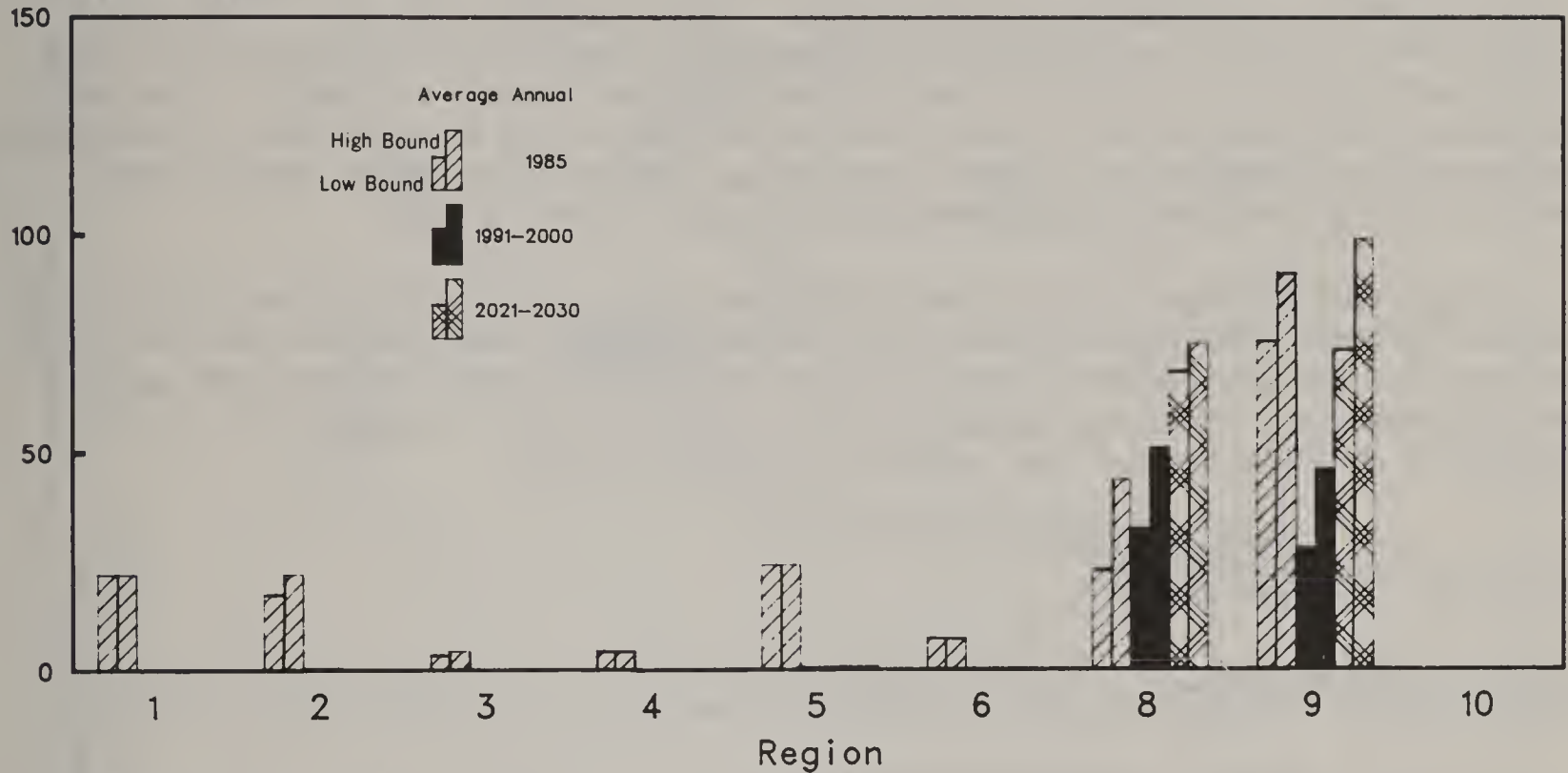
The Program would provide technical assistance and advice through State forestry organizations to nonindustrial private forest landowners in the preparation of multiresource forest management plans. These plans are especially significant because they guide and foster on-the-ground management practices.

^{32/} 36 Stat. 961, as amended; 16 U.S.C. 480 et seq.

Figure 1.28

Regional Estimates-Recommended Program Land Purchase and Acquisition (NFS)

Thousand Acres

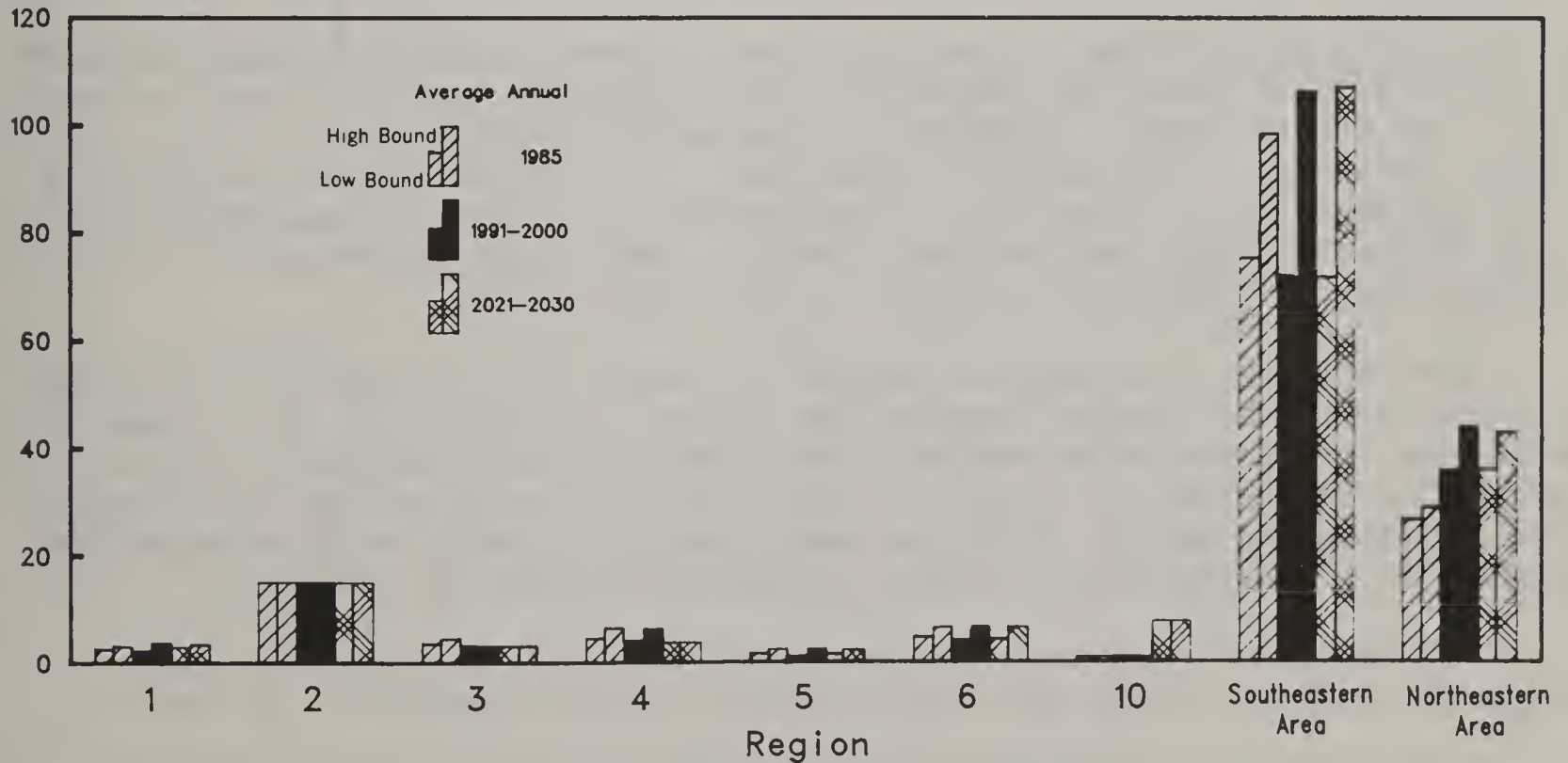


Includes Land and Water Conservation Fund Purchases
Excludes Land Exchanges

Figure 1.29

Regional Estimates-Recommended Program State Forest Resource Planning (S&PF)

Million Acres



Most forest and rangelands of the Nation are privately owned, particularly in the East. Private forest lands, particularly nonindustrial lands, are considered to have the greatest potential to supply additional multiresource outputs. In total, these non-Federal lands represent a large potential source of multiresource outputs.

Industrial forest owners respond to market forces and have well identified interests in research applications. Nonindustrial owners often lack incentives, may not have adequate information, and may not have or hire the management skills to identify multiresource planning objectives. Technical assistance through State forestry organizations would be provided to encourage landowners to prepare and update individual forest management plans that reflect their individual landownership goals (figure 1.30).

Field professionals in other USDA Agencies--particularly the Soil Conservation Service, the Agricultural Stabilization and Conservation Service, and Science and Education Administration-Extension--also help to provide advice to landowners on forestry opportunities, and to refer landowners to service foresters or consultants for technical forestry help.

Research Program

Support Element Goals.--Develop improved methods for economic analyses of multiresource management and use alternatives on all forest and rangelands.

Develop improved methods for multiresource inventories and analyses of all renewable resources on a 10-year cycle.

Develop and maintain continuing access to foreign sources of scientific and technological information useful for improved protection and management of forest resources. Share, at the international level, in developing new knowledge and applying it to forest resource management situations throughout the world.

Complete the national network of Research Natural Areas (RNA) on lands administered by the Forest Service, and collect and compile baseline data from RNA's that are necessary for measuring long-term environmental change.

Program Objectives.--The Program for forest economics would include research on efficiency of managing, processing, and distributing a full range of products from forest lands. Research on institutional factors such as taxation and international trade would be continued. In addition, forest economics research would provide methods to improve land and resource management planning at local, State, and national levels. The supply demand analytical methods would be improved in support of the RPA process.

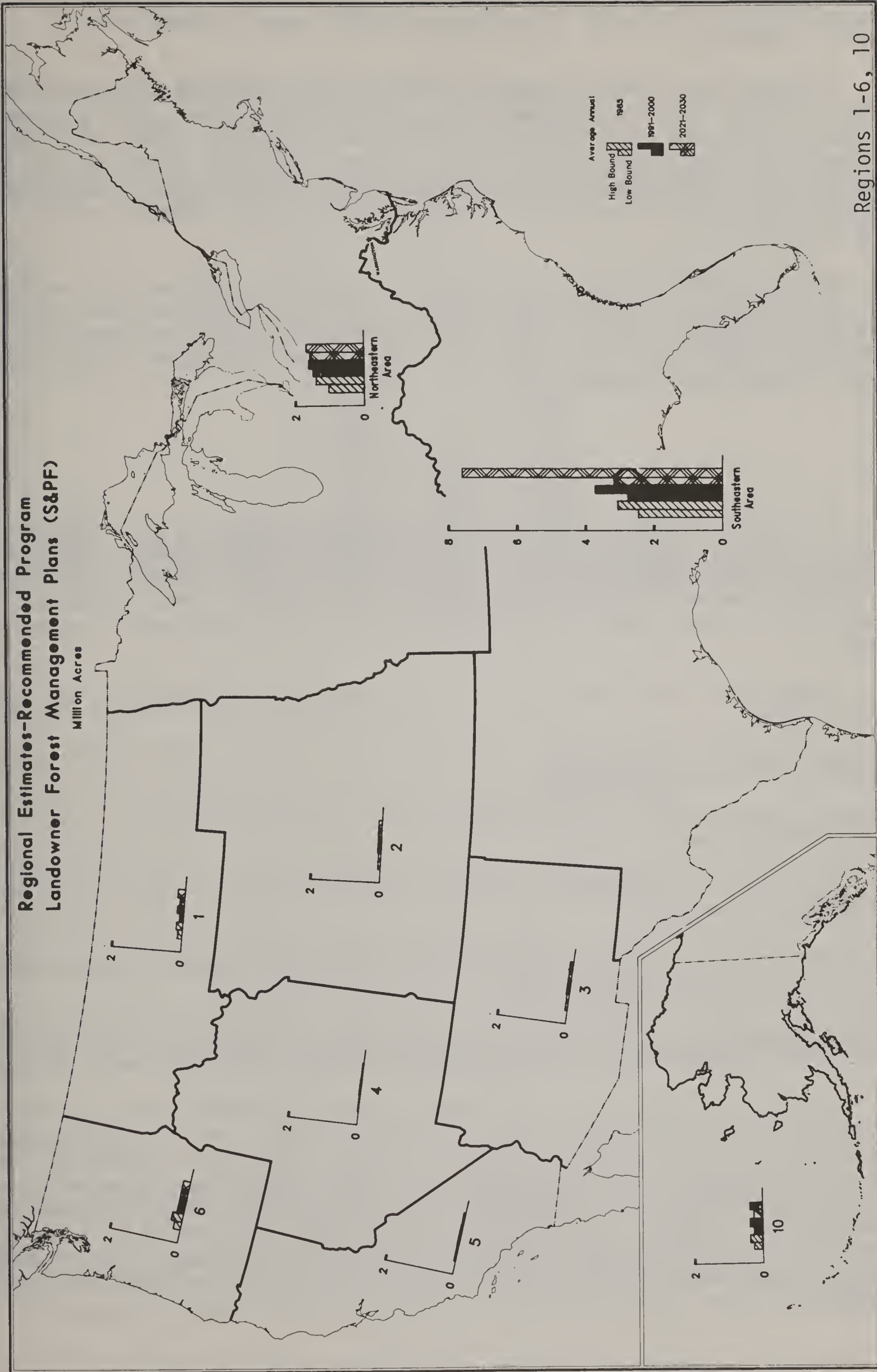
Renewable resource evaluation research would develop methods for expanding the continuing timber inventory to include inventories of all renewable resources. Information on amount, condition, and availability of forage, recreation resources, wildlife habitats, and other resources would be developed. Within the next 5 years, an operational continuing multiresource inventory of the Nation on a 10-year average cycle would be started.

Two additional areas of research, international forestry, and basic research, address issues that are important to all elements but do not fit

Figure 1.30

Regional Estimates-Recommended Program Landowner Forest Management Plans (S&PF)

Million Acres



Regions 1-6, 10

well within any single element. They have been placed in the lands element because results from these initiatives strongly support stewardship of natural resources.

International forestry research would develop technology suited to improving natural resource management in developing countries. This research supports growth and conversion of wood for use as fuel, and the combining of tree crop culture with food crop production. Research in the Man and Biosphere Program (MAB) would lead to new knowledge about forestry issues with international implications such as depletion of tropical forests and desertification.

Research would provide a mechanism for gathering baseline data necessary for measuring long-term ecological changes on Research National Areas (RNA's) already established, and make provisions for the collection of these data on RNA's yet to be established. This effort would be coordinated between university and Forest Service personnel.

Soils

The soils support element includes activities necessary to maintain and facilitate outputs of other resources. This element provides for protection, conservation, and enhancement of soil productivity of forest and rangelands. It includes research surveys, protection, rehabilitation, and improvement activities directed toward non-Federal as well as National Forest System lands.

Program goals and objectives for soils management, assistance, and research follow:

National Forest System Program

Support Element Goals.--Provide technical soil services needed to maintain soil productivity.

Provide soil inventory data as the information base for land management and project planning.

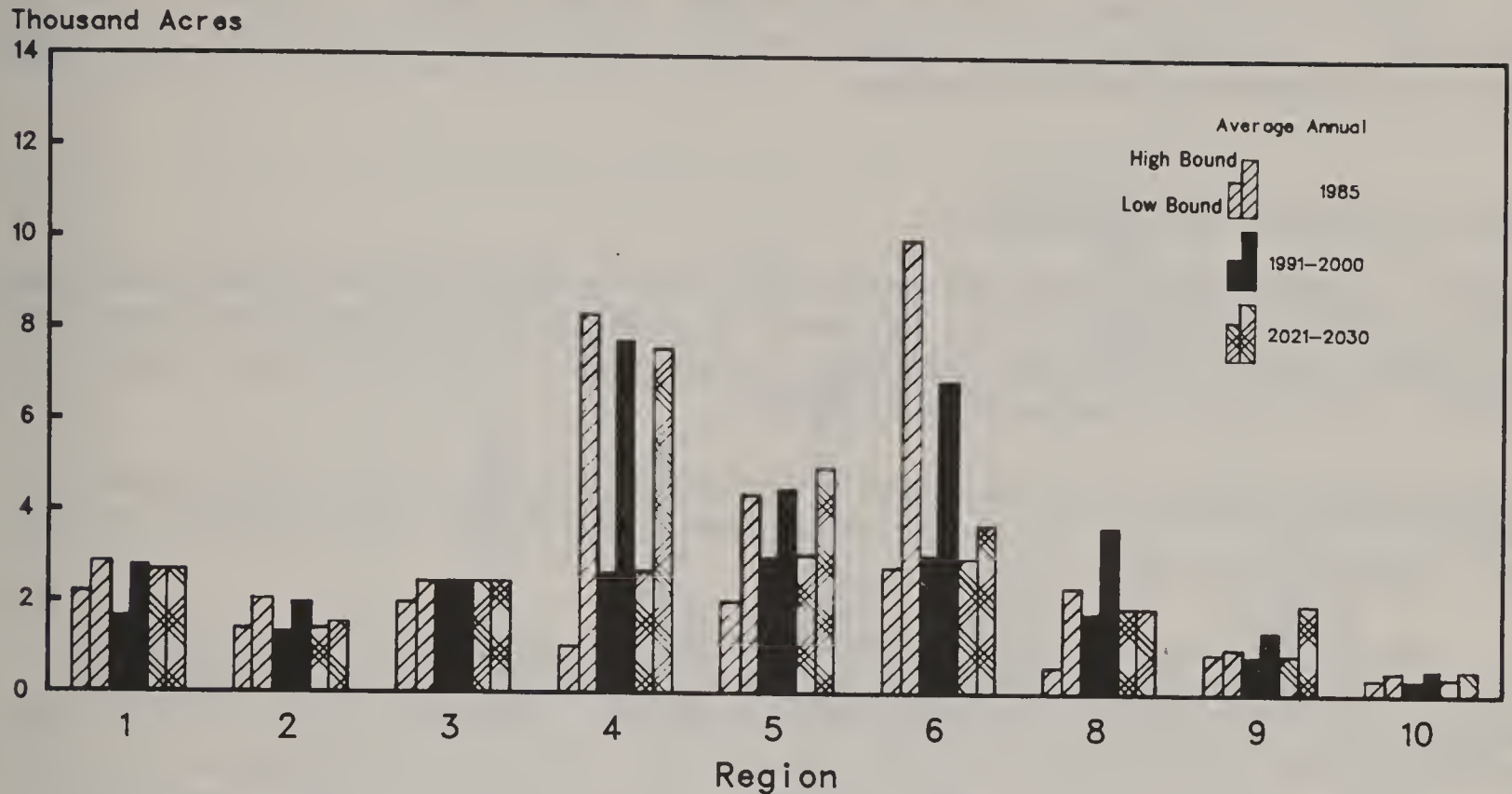
Provide for reclamation efforts on abandoned minelands to reduce erosion and increase productive capacity.

Program Objectives.--Both Bounds of the Program would provide for inventories, monitoring, basic data for land management planning, and improvement programs.

Soil support activities are designed to meet Clean Water Act planning requirements for water quality and pollution abatement, and to minimize the degradation of the soil brought about by various activities on National Forest System lands (figure 1.31). The soil improvement program would include treatment of degraded areas to return them to or above natural levels of vegetative productivity. Physical and chemical soil characteristics would be improved where it is economically justifiable and environmentally sound. Reclamation of mined lands would be conducted to restore resource values that have been damaged.

Figure 1.31

Regional Estimates-Recommended Program Soil and Water Quality Improvement (NFS)



State and Private Forestry Program

Support Element Goal.--Provide assistance for protection and improvement of soil fertility and training in soil data interpretations for forest management purposes, in cooperation with the Soil Conservation Service.

Program Objectives.--The Program for State and Private Forestry would provide assistance to State forestry agencies for the protection of soil and improvement of soil fertility. The assistance would be provided to reduce erosion and sedimentation associated with grazing, timber harvest, site preparation, mining and developed recreation, and thus to preserve soil fertility. The assistance would occur principally in the Northeast and South and would continue in the West. Application-oriented assistance would be provided to supplement planning assistance. Assistance would be centered around river basin studies, small watershed planning, and Section 208 planning. Although some financial assistance is provided, the assistance is primarily technical.

Research Program

Support Element Goal.--Develop basic knowledge about soil-plant-water relationships necessary for the maintenance and improvement of soil productivity.

Program Objectives.--Soils research is conducted under the timber, water, and minerals elements. Soils research would provide further basic knowledge about soil-plant-water relationships to maintain and improve soil conditions for

timber, livestock forage, and wildlife habitat production; to rehabilitate disturbed lands; and to protect watershed values.

Facilities

The facilities support element includes activities that provide and maintain capital improvements such as buildings, roads, fences, bridges, dams, and airfields. Program goals and objectives for facilities to support the Forest Service program are outlined below:

National Forest System Program

Support Element Goal.--Provide cost-effective maintenance and expansion of utility services, buildings, road systems, communication systems, and water impoundments needed to achieve resource output goals efficiently and meet health, safety, and energy conservation standards.

Program Objectives.--The Low Bound Program would provide for replacement and major retrofit of facilities to meet current health and safety needs and promote energy conservation.

The High Bound of the Program would provide for capital investment in facilities to permit necessary increases in outputs. Facilities would be improved and related health and safety problems eliminated on a current basis to prevent deterioration or unsafe conditions. Specific programs of energy conservation, safe potable water systems, dam and bridge safety, handicap access, and highway safety are included here. New technology would be applied as available.

The work that must be accomplished by Regions in order to complete their individual principal transportation systems by the year 2010 is displayed in figure 1.32. Additional miles of roads to be constructed for specific resource activities are contained in the individual program element output, activity, and cost figures.

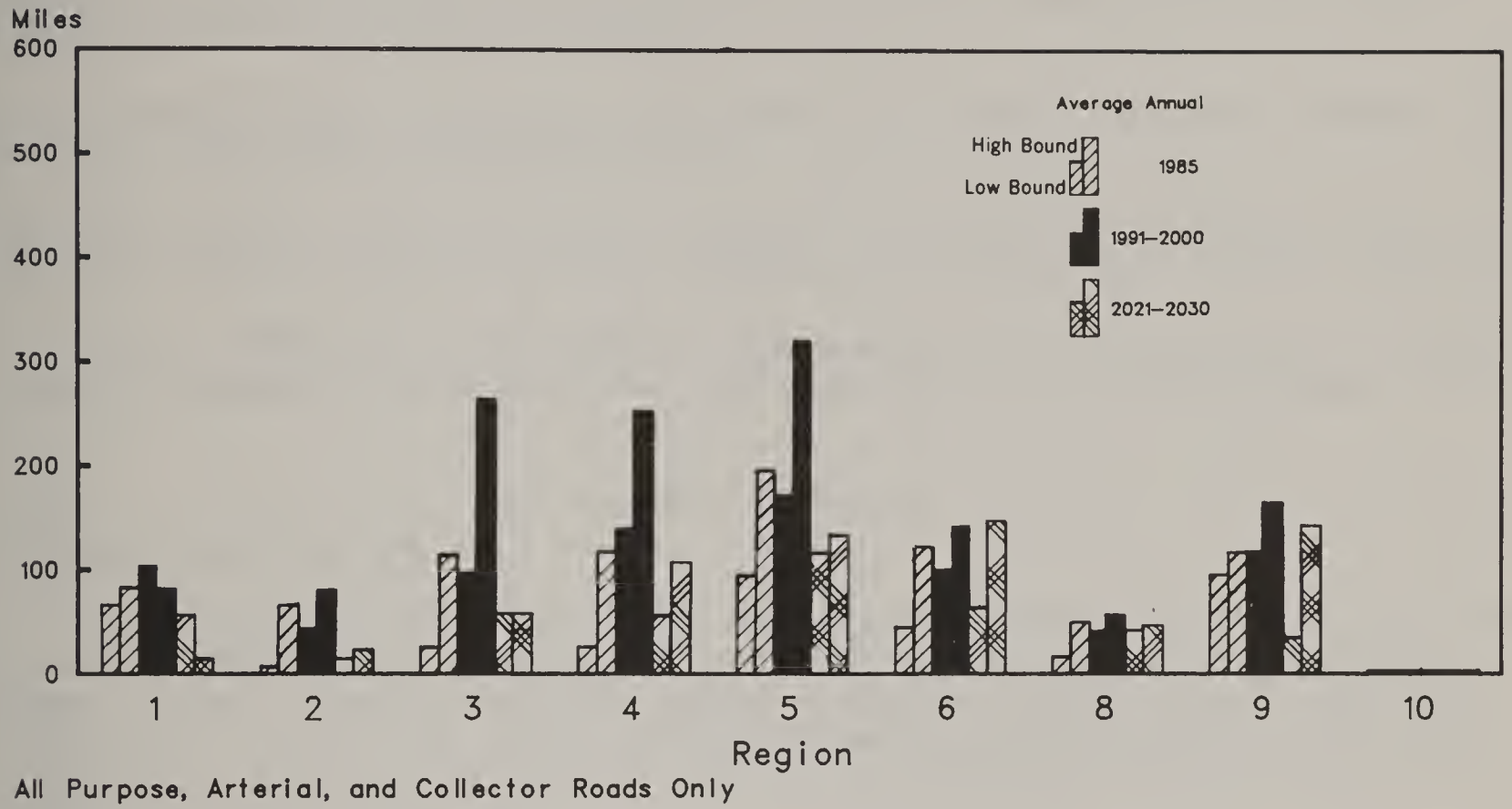
Research Program

Support Element Goal.--Construct new research laboratories needed to support high priority research. Continue conversion for energy conservation.

Program Objectives.--Research facilities would be improved as needed to support intensified research under the Recommended Program, to conserve energy, and to protect the health and safety of employees and the public.

Figure 1.32

Regional Estimates-Recommended Program Road Construction/Reconstruction (NFS)



PART III: ESTIMATED ENVIRONMENTAL EFFECTS OF THE RECOMMENDED PROGRAM

This part summarizes the estimated environmental effects of the Program in terms of economic, physical-biological, and social impacts. Estimates of physical, biological, and social effects were made for the entire planning period by selecting 1985 as representative of short-term effects and 1995 as representative of long-term effects.

Economic effects are described in terms of present net worth, returns to the U.S. Government, and other factors.

Physical-biological effects are described in terms of water quality, air quality, wildlife and fish, visual quality, vegetation, and cultural resources.

Social effects are described for the population as a whole and for people living in nonmetropolitan counties dependent on Forest Service programs.

Economic Effects

National Forest System

The analysis of total costs and the associated resource benefits from the National Forest System showed positive net present values for the National Forest System. Present net worth (total discounted benefits over costs) was calculated to range from \$47.5 billion at the Low Bound to \$48.9 billion ^{33/} at the High Bound using a discount rate of 7-1/8 percent over the 50-year planning period (table 1.23).

The present net worth at both Bounds of the Program exceeds that for any of the five alternative program directions that were originally developed. They are shown in chapter 3.

The timber and water elements provide the largest net benefits. Together these elements account for over 60 percent of present net worth. Other elements having high values are recreation and minerals.

All Regions have a positive present net worth in the recreation, wilderness, wildlife and fish, and water elements. The Pacific Southwest Region (Region 5) and the Southern Region (Region 8) contribute over 52 percent of the recreation element present net worth (33 and 19 percent, respectively). Also, the Pacific Southwest (Region 5) and Region 2 of the Rocky Mountains contribute over 63 percent of the wilderness element present net worth. Region 1 of the Rocky Mountains contributes over 35 percent of the water element present net worth.

The timber element in the Pacific Coast Regions (Regions 5 and 6) makes the largest contribution toward the total national present net worth. On the other hand, Regions 2 and 4 of the Rocky Mountains, the Eastern Region (Region 9), and Alaska (Region 10) have negative present net worths for direct timber values.

^{33/} Throughout the economic analysis, costs and returns are expressed in constant 1978 dollars.

Table 1.23.--National Forest System present net worth 1/ for the High and Low Bounds of the Recommended Program, by resource element and region

Element	Bound	NFS Regions								Total by Element	
		1	2	3	4	5	6	8	9		10
		Million Dollars									
Recreation	High	119	1,049	393	522	2,677	764	1,518	781	198	8,021
	Low	98	978	391	521	2,618	759	1,474	772	148	7,759
Wilderness	High	87	358	78	208	980	72	26	245	1	2,055
	Low	74	323	72	183	689	71	2	181	1	1,596
Wildlife & Fish	High	176	791	416	557	301	518	298	300	305	3,662
	Low	172	693	404	527	249	485	293	289	151	3,263
Range	High	46	81	-5	-51	11	-2	2	-7	NA 3/	75
	Low	48	82	41	-48	14	1	2	-7	NA	133
Timber	High	25	-147	41	-55	3,916	15,039	569	-646	-573	18,169
	Low	151	-121	52	-25	3,510	14,385	543	-372	-559	17,564
Water	High	4,158	1,284	98	1,716	1,151	1,514	254	32	1,339	11,546
	Low	4,156	1,293	139	1,782	1,291	1,531	261	64	1,351	11,868
Minerals 2/	High	574	1,581	702	1,431	2	-75	137	429	608	5,389
	Low	564	1,571	698	1,422	2	-75	129	421	595	5,327
Total by Region	High	5,185	4,997	1,723	4,328	9,038	17,830	2,804	1,134	1,878	48,917
	Low	5,263	4,819	1,797	4,362	8,373	17,157	2,704	1,348	1,687	47,510

1/ Discounted at 7-1/8 percent over the 50-year planning period.

2/ Value for locatable materials other than uranium and thorium was not determined. This primarily underestimates the values in Regions 5 and 6.

3/ Not applicable, Region 10 has no range program.

For minerals, the southern portion of the Rocky Mountains (Regions 2, 3, and 4) contributes over two-thirds of the present net worth. The large benefits in these Regions are due to energy-related materials.

Gross returns to the U.S. Government expected from sale (or lease) of National Forest System resources for the Program are \$1,692 million in 1981, \$2,034 to \$2,359 million in 1985, \$2,890 to \$3,060 million in 1995, and \$5,444 to \$6,923 million in 2025. These values include receipts collected by the Bureau of Land Management, U.S. Department of the Interior, for mineral rights on National Forest System land. They also include cash payments, required deposits from purchases to finance activities resulting from the sales (such as Knutson-Vandenberg deposits), and credits allowed for work performed by the purchasers. Gross returns exceed total costs for the National Forest System by the year 1986 and thereafter at both Bounds. Estimated net returns for selected years are presented in table 1.24.

Payments in Lieu of Taxes.—The Act of October 20, 1976, commonly referred to as the Payments in Lieu of Taxes Act, 34/ provides for annual payments to certain units of local government. Local governments receiving these payments are those in which "entitlement lands" are located. It is estimated that, for the High Bound, payments to counties would be \$508 million in 1985, \$636 million in 1995, and \$1,424 million in 2025. For the Low Bound, payments would be \$448 million in 1985, \$614 million in 1995 and \$1,138 million in 2025. "Entitlement lands" include National Forest System lands, National Park System lands, and lands administered by the Secretary of the Interior through the Bureau of Land Management. The amount of the payments to each unit of local government is equal to the greater of the following amounts:

1. 75 cents per acre of entitlement land (but not in excess of amount determined by reference to a chart in the Act which is based on population) less payments received in the prior year under various other acts including the 25 percent payments from the National Forest and National Grasslands receipts or

2. 10 cents per acre of entitlement land unresponsive to changes in payments under other acts (but not in excess of the population limitation referred to above).

Payments are in addition to payments made under other acts. Payments to States and counties from National Forest System receipts figure in the computation of payments. However, the effect of increases or decreases in 25 percent payments from National Forest System receipts on the level of payments cannot be generally stated. The reason is that individual payments to local governments are affected by a number of factors. The payment may already be limited to the minimum payment because of the high level of payments per acre under the other acts; therefore, an increase in payments from National Forest System receipts would not result in a corresponding decrease in other payments. Alternatively the population limitations may make the payment unresponsive to changes in the payments under other acts.

34/ 90 Stat. 2662; 31 U.S.C. 1601-1607.

Table 1.24.--The Recommended Program's annual returns to the
U.S. Government (either cash receipts or credits)
by element and selected year

Element	Year						
	1981	1985		1995		2025	
		Upper	Lower	Upper	Lower	Upper	Lower
(Million dollars)							
Recreation	15	16	14	23	21	26	25
Grazing	23	18	17	20	19	22	20
Timber	1,495	1,958	1,730	2,436	2,376	5,548	4,434
Minerals, NFF <u>1/</u>	<u>21</u>	<u>40</u>	<u>29</u>	<u>64</u>	<u>41</u>	<u>100</u>	<u>74</u>
Total NFF <u>2/</u>	1,554	2,032	1,790	2,543	2,457	5,696	4,553
Minerals, BLM <u>3/</u>	<u>138</u>	<u>284</u>	<u>244</u>	<u>517</u>	<u>433</u>	<u>1,227</u>	<u>891</u>
Total estimated re- turns to government	1,692	2,316	2,034	3,060	2,890	6,923	5,444
Total estimated cost (NFS)	1,666	2,359	1,827	2,300	1,852	2,439	1,888
Estimated net returns	+26	-43	+207	+760	+1,038	+4,484	+3,556

1/ (NFF) National Forest Fund

2/ Historically, approximately 25 percent of the National Forest receipts have been paid to State and local county governments. These payments are part of the total National Forest Fund. The Bureau of Land Management also makes payments to general purpose local governments whose jurisdictions contain public lands. These take the form of "payments in lieu of taxes" as well as payments of distributed revenues accruing from such lands.

3/ Mineral royalties collected from National Forest lands and reported by Bureau of Land Management.

State and Private Forestry

For the State and Private Forestry program, the RPA Assessment identified many opportunities for improving timber management on private lands. 35/ In total, about 168 million acres were identified where treatments would yield returns in excess of 4 percent above inflation. At both Bounds the Program for State and Private Forestry will help treat about 1 million of these acres

35/ For further details of the analysis, see Dutrow, George, 1979. Assessment of state and private forestry opportunities to achieve RPA goals. USDA Forest Service. 18 pp.

Dutrow, George F., J. Michael Vasievich, and Merle E. Conkin. Economic opportunities for increasing timber supplies in the United States; USDA Forest Service and the Forest Industries Council (in press).

annually (table 1.25). Results of these efforts plus those to improve utilization should yield at least an additional 83 million cubic feet of growth or product yield per year. The main economic effect would be slightly lower prices due to higher supply levels relative to demand.

Table 1.25.--Acreage, growth, and expenditure increments for forest investments available on private lands

Investments	Acres treated annually (millions)	Annual expenditures over 10-year period (\$)		Annual growth (cubic feet)	
		Per acre	Total (millions)	Per acre	Total (millions)
S&PF Program	1.0	80 <u>1/</u>	80	83	83
Forest Industry	3.4	80	272	79	269
Total	4.4		352		352

1/ Includes \$44 per acre of Federal contributions (Forestry Incentives Program, Agricultural Conservation Program, Rural Forestry Assistance Program).

Economic impacts of the State and Private Forestry program were evaluated with the Timber Assessment Market Model. 36/ This analysis revealed that the State and Private Forestry program would decrease the dependence on softwood imports from Canada by about 500 million board feet in 2010 and by almost 2 billion in 2030 as more timber stands mature from earlier investments (table 1.26).

Table 1.26.--Annual imports from Canada

Investments	1976	Year 2010	2030
	(billion board feet)		
Present level <u>1/</u>	7.91	13.03	9.25
S&PF program		12.56	7.35
Forest industry		11.52	3.21

1/ Includes National Forest System Recommended Program as continuation of present timber investment trends.

36/ Adams, Darius M., and Richard W. Haynes. 1979. The 1980 softwood timber assessment market model: structure, projections, and policy simulations. USDA Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oregon.

Similarly, the State and Private Forestry program would help reduce wholesale prices of lumber and plywood by about 2 percent. Although it is not likely that forest industries will make all potential timber investments yielding returns greater than 4 percent, it is assumed that forest industries could invest in up to 70 percent of total opportunities and that other land-owners would make additional investments, which would further reduce imports. Tables 1.25 through 1.28 depict the results of S&PF investments at \$80 million and 100 percent accomplishment of forest industry and other investment opportunities that could yield returns in excess of 4 percent above inflation.

Table 1.27.--Wholesale price index for lumber

Investments	1976	Year 2010	2030
(1967 = 100)			
Present level <u>1/</u>	121	248	296
S&PF program		246	292
Forest industry		243	283

1/ Includes national Forest System Recommended Program as a continuation of present timber investment trends.

Table 1.28.--Wholesale price index for plywood

Investments	1976	Year 2010	2030
(1967 = 100)			
Present level	108	211	231
S&PF program		210	228
Forest industry		207	223

Research

Although benefits of research activities are uncertain and difficult to quantify, the impact of innovations can be very large. Reduced costs, increased supplies, better products, and less environmental degradation can be achieved through an aggressive research program. For instance, research, development and application efforts can have significant impacts on softwood timber supplies. Improvements in utilization of forest products can greatly increase wood supplies. One of the most cost-effective methods for expansion of supplies in the short run is through innovations in logging and manufacturing technology, utilization of low quality hardwoods, and use of wood residues for energy and products. Additional long-term gains in timber supply can be obtained through more intensive management of forest lands after 2000.

Forest products research can significantly increase available softwood timber through new processes, new products, and technical assistance. Programs to improve felling and bucking practices can increase lumber yields 1 billion board feet by the year 2000 at a research cost of \$2.5 million with a modest rate of adoption. Programs to improve quality in sawmills could provide an additional 1.25 billion board feet at a cost of \$3.0 million. New techniques in building construction concentrating on reduced lumber use can save 2.5 billion board feet per year. New processes to substitute some hardwood for softwood structural lumber could relieve the softwood shortfall. Hardwood flakeboard, composite lumber, and hardwood molding could substitute for 1 billion board feet of softwood lumber at a cost of \$2.5 million. Improving systems for harvesting acreages now considered uneconomical can provide an additional 2 billion board feet per year for \$3 million. Over a 20-year period it is expected that this additional increment of timber will have a research cost of about \$3 per 1000 board feet of timber.

To partly evaluate the potential impact of the Program for Research, a historical analysis was conducted of 81 selected innovations. A broad spectrum of Forest Service research programs was examined using procedures described by Battelle.^{37/} This study was done to demonstrate the kinds and magnitudes of benefits that could accrue from the Program. Innovations were selected to meet the needs of RPA and illustrate the array of benefits resulting from Forest Service Research.

This analysis showed that Forest Service Research has been extremely successful. More than half of the innovations reviewed resulted in benefits that increased income or employment in forest industries or other sectors of the regional economy. Other benefits from these innovations included improved utilization of natural resources and improved quality of the environment. In 40 to 50 percent of the cases, old products were improved, new products were developed, decisions were improved, management costs were reduced, or costs and prices for commodities were reduced. One-third of the innovations led to improved visual amenities or to management practices that increased resource productivity. Although other benefits occurred less often, they were significant in reducing costs, improving efficiency, and enhancing the public welfare.

The study also showed that the dollar benefits from 22 (out of 81) innovations for which dollar benefits could be identified totaled \$2.6 billion. It is assumed that research on the problems selected will be as effective, and that returns will be as great as they have been in the past.

Physical-Biological Effects

Water Quality

The continuing interest in the quality of the environment has strongly influenced the Program. Water from forested lands generally meets quality goals, but land-disturbing activities often cause localized and limited short-term nonpoint-source pollution. Water quality returns to original levels 3 to 5 years after disturbance--sometimes much sooner. Typically, forests and rangelands produce water of above-average quality. Even so, controlling

^{37/} Battelle Memorial Institute, 1973. Interactions of science and technology in the innovative process: some case studies; final report. Prepared for the National Science Foundation (Contract: NSF-667).

water pollution and improving the quality of water from National Forest System lands and private forest lands are high priority objectives. Water quality goals are set forth in the Clean Water Act. Among other provisions, these goals specify that "...wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shell fish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983;" Further, sediment produced from degraded lands that results in reduced water quality will be eliminated by the year 2000 as set forth in section 9 of the Forest and Rangeland Renewable Resources Planning Act.

Because of increasing emphasis on minimizing nonpoint-source pollution, Best Management Practices (BMPs) have become a key concept. For purposes of forest management, "BMPs are those methods, measures, or practices to prevent or reduce water pollution and include but are not limited to structural and nonstructural controls, and operation and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters. Economic, institutional, and technical factors shall be considered in developing BMPs. BMPs shall be developed in a continuing process of identifying control needs and evaluating and modifying the BMPs as necessary to achieve water quality goals..." 38/

Sediment and organic debris resulting from land management activities, application of chemicals, increased release of nutrients, and removal of vegetative cover along streams producing thermal pollution are the more important water pollutants generated by activities on forest and rangelands. The impacts of these potential pollutants would be lessened by utilizing practices such as locating, scheduling, and designing activities to prevent or minimize the aggravation of inherent pollution hazards, identifying specific protection requirements for stream channels and streamside areas, prompt revegetation of cleared areas, installation or application of water control measures, and diligent control in the application of fertilizers, pesticides and other chemicals.

The High Bound program would provide increases in water resource inventory monitoring, improvement, and land management planning information to meet an increase in commodity production and to maintain water and environmental quality. Because this program is commensurate with the levels of activity in other resource elements, it will meet water quality goals by 2000. Water yield would increase in Regions 2, 3, and 5. The Low Bound Program would continue current levels of water resource inventory, monitoring, improvement, and land management planning information and also would meet water quality goals by the year 2000. However, if there were an increase in commodity production above the current program without a commensurate increase in the water program, emphasis would be shifted from the improvement program to a more intensive data collection program. This change would make it difficult to meet water quality goals. Water yield would be maintained at present levels at the Low Bound.

The water quality management aspects of the program will be fully integrated with and complementary to water quality management programs of the States. Integration includes working with the States to identify and protect outstanding natural waters, to develop effective training programs, and to develop and implement Best Management Practices to control nonpoint-source

38/ 40 CFR 35.1521-4(C).

pollution. It also includes active participation with the Environmental Protection Agency and the States in resolving priority environmental problems, in carrying out related demonstration programs, in identifying site-specific water quality standards, and in achieving Clean Water Act goals.

Air Quality

Short-term increases in emission levels are expected under both Bounds of the Program, but long-term reductions are expected as a result of research, improved air management practices, better utilization, and commitment to Clean Air Act requirements.

Air quality over much of the Nation's forest and rangelands is better than national primary and secondary ambient standards. However, some forest and rangelands near major metropolitan areas or industrial complexes continue to be adversely affected by air pollution. Studies also have shown adverse effects to aquatic and even terrestrial resources from acid precipitation downwind from major pollution sources. Smoke management programs are being employed to reduce the impacts of prescribed burning on designated smoke sensitive areas. Implementation of the prevention of significant deterioration (PSD) provisions of the Clean Air Act will benefit Class I areas by reducing pollutant effects from new or modified, stationary, major emitting facilities. National energy needs and increased use of fossil fuels will increase our involvement in PSD reviews.

Program activities such as road construction and mining that expose soil to wind erosion would reduce air quality. Potential adverse effects would be mitigated by surface treatments and traffic controls. Other activities such as range revegetation programs would improve vegetative cover and result in less soil being carried into the atmosphere.

The Environmental Protection Agency (EPA) has the responsibility to establish a national monitoring system under Section 319 of the Clean Air Act. The existing system is designed to gather health-related information and therefore is primarily urban oriented. However, it does not include visibility monitoring. Thus, forest and rangeland managers receive little benefit from the data collected. It would be helpful if the national air monitoring system was expanded to gather appropriate data for rural areas. Operations of an enlarged system would probably require participation of State and Federal land managers. For example, monitoring of Class I areas may best be done by a joint program between EPA and public land managers. Provision for shared monitoring is made in section 319 of the Clean Air Act. The Forest Service will appropriately monitor program activities to ensure that national ambient air quality standards, as well as standards for hazardous air pollutants, are met.

Research is underway to determine air pollution effects on forest ecosystems and to develop better methods to minimize environmental effects.

Wildlife and Fish

The Program would have significant beneficial effects on wildlife and fish habitats and on plant and animal species. Estimates of the effects of the Program on present Management Indicator Species are presented in chapter 4, and tables 4.12, 4.13, and 4.14. Below, estimated effects of the Program

are briefly summarized for endangered and threatened species and for other indicator species.

Endangered and Threatened Species.--Most endangered and threatened animal species are benefited and none are adversely affected at the High Bound of the Program (table 1.29). For a few species in several Regions, the populations would remain stable because of limited opportunities for increases or lack of knowledge of the means to increase populations. At the Low Bound of the Program, all endangered and threatened animal populations would remain stable.

Table 1.29.--Population trend predictions for endangered and threatened animal species

Species and Region	Population trend		
	Present	1995	
		High	Low
Grizzly bear			
1	SS	SS	SS
2	SS	SS	SS
4	SS	++	SS
6	SS	SS	SS
Bald eagle			
1	SS	++	SS
3	--	++	SS
4	SS	++	SS
5	SS	++	SS
6	SS	++	SS
9	++	++	SS
Peregrine falcon			
1	SS	++	SS
2	++	++	SS
3	--	++	SS
5	++	++	SS
6	++	++	SS
Black-footed ferret			
1	SS	SS	SS
Gray wolf			
1	SS	SS	SS
9	--	++	SS
Red-cockaded woodpecker			
8	++	++	SS
Spotfin chub			
8	SS	++	SS
Apache trout			
3	SS	++	SS
Gila trout			
3	SS	++	SS
Greenback cutthroat trout			
2	++	++	SS
Lahontan trout			
4	SS	++	SS
5	SS	++	SS

++, increasing; ss, stable or no change; --, decreasing

Population of 8 of the 14 endangered and threatened plant species would increase, and 6 species would be stable by 1995 at the High Bound of the Program (table 1.30). At the Low Bound, 5 populations would decline and the remaining 9 species would remain stable.

Table 1.30.--Population trend predictions for endangered and threatened plant species

Species	Region	Population trend		
		Present	1995	
			High	Low
Arizona hedgehog cactus (<u>Echinocereus triglochidiatus</u> var. <u>arizonicus</u>)	3	ss	++	ss
Spineless hedgehog cactus (<u>Echinocereus triglochidiatus</u> var. <u>inermis</u>)	4	ss	ss	ss
Kuenzler hedgehog cactus (<u>Echinocereus kuenzleri</u>)	3	--	++	ss
Nichol's Turk's head cactus (<u>Echinocactus horizonthalonius</u> var. <u>nicholii</u>)	3	--	ss	ss
Peebles navajo cactus (<u>Pediocactus peeblesianus</u> var. <u>peeblesianus</u>)	3	ss	ss	ss
Sneed pincushion cactus (<u>Coryphantha sneedii</u> var. <u>sneedii</u>)	3	ss	ss	ss
MacFarlane's four-o'clock (<u>Mirabilis macfarlanei</u>)	4 6	-- ss	++ ++	-- --
Virginia round-leaf birch (<u>Betula uber</u>)	8	ss	ss	ss
Rydberg milk-vetch (<u>Astragalus perianus</u>)	4	ss	ss	ss
Truckee barberry (<u>Berberis sonnei</u>)	5	ss	++	ss
McDonald's rock-crest (<u>Arabis mcdonaldiana</u>)	5 6	ss --	++ ++	-- --
<u>Phacelia agrillacea</u>	4	--	++	--

++, increasing; ss, stable or no change; --, decreasing

Other Species.--At the High Bound of the Program, the population of Sitka blacktailed deer and marten, both in Region 10, would decline by 1995 as a consequence of the harvest of old-growth timber stands (table 1.31). The remaining species, which are indicators of biological effects, either would remain stable or increase. At the Low Bound, only the beaver (Region 9), Abert squirrel (Region 3), and all squirrels (Region 8) remain stable; the remaining species decline by 1995.

Table 1.31.--Population trend predictions for indicator mammal species

Species and Region	Population trend		
	Present	1995	
		High	Low
Beaver			
9	--	++	ss
Mule deer			
2	++	++	--
4	++	ss	--
5	++	++	--
Sitka black-tailed deer			
10	--	--	--
White-tailed deer			
1	ss	ss	--
8	++	++	--
9	--	ss	--
Elk (Rocky Mountain)			
1	++	ss	--
2	++	++	--
3	++	++	--
4	++	++	--
6	++	++	--
Elk (Roosevelt)			
6	++	++	--
Fisher			
1	ss	ss	--
Marten			
2	--	ss	--
5	ss	ss	--
10	--	--	--
Mink			
10	--	ss	--
Otter			
1	ss	ss	--
Abert squirrel			
3	--	++	ss
Squirrels			
8	++	++	ss

++, increasing; ss, stable or no change; -- decreasing

At the High Bound of the Program, populations of several species of birds which are indicators of biological effects are predicted to continue to decline in Regions where a decrease in the amount of old-growth timber is foreseen (table 1.32). Nine species would increase in the majority of Regions, while a few would be maintained at the current level. At the Low Bound, nine species would remain stable, and the remaining species would decline.

Table 1.32.--Population trend predictions for indicator bird species

Species	Region	Population trend		
		Present	1995	
			High	Low
Lesser Black hawk	3	--	++	--
Cooper's hawk	4	--	ss	--
Northern goshawk	3	--	++	--
	4	--	++	--
Great blue heron	9	ss	++	--
Ruby-crowned kinglet	10	--	--	--
Osprey	8	++	++	ss
Barred owl	8	ss	++	ss
Spotted owl	3	--	--	--
	5	--	--	--
	6	--	--	--
Brewer's sparrow	4	++	ss	--
Yellow bellied sapsucker	4	ss	ss	ss
	10	--	--	--
Downy woodpecker	2	--	ss	ss
Hairy woodpecker	1	--	--	--
	4	ss	ss	ss
Pileated woodpecker	1	--	--	--
	6	--	ss	--
	9	--	++	ss
Red-headed woodpecker	8	ss	++	ss
House wren	2	ss	ss	ss
Sage grouse	4	--	ss	--
Wild turkey	9	ss	++	--

++, increasing; ss, stable or no change; --, decreasing

In most Regions, fish species which are indicators of biological effects would be benefited by the High Bound Program (table 1.33). The exception is in Region 1 where the grayling is expected to decline because the harvest of old-growth timber probably cannot be offset by cost-effective improvements. At the Low Bound, all species are expected to decline by 1995, except for the largemouth bass (stable) and chinook, coho, and pink salmon (slight increase). The increase in salmon is due to a special emphasis program limited to fiscal year 1981 for those species.

Table 1.33.--Population trend predictions for indicator fish species

Species	Range	Population trend		
		Present	1995	
			High	Low
Largemouth bass	8	ss	++	ss
Smallmouth bass	9	--	++	--
Brook trout	9	--	++	--
Brown trout	2	ss	ss	--
	3	--	++	--
Cutthroat trout	1	ss	++	--
	2	--	ss	--
	4	ss	++	--
Rainbow trout	1	ss	++	--
	3	--	++	--
	8	ss	++	--
Resident trout	6	ss	++	--
Steelhead trout	1	--	++	--
	5	--	++	--
	6	--	++	--
Grayling	1	ss	--	--
Chinook salmon	1	--	++	++
	4	--	++	++
	6	--	++	++
Coho salmon	6	--	++	++
	10	--	++	++
Pink salmon	10	--	++	++

++, increasing; ss, stable or no change; --, decreasing

Visual Quality.--Both the High and Low Bounds of the Program would maintain or enhance visual quality. Land management activities are designed, wherever practicable, to introduce variety and create forest landscapes that are attractive as well as productive. Such landscapes are designed to be immediately attractive and to retain or improve their appearance over the decades, as vegetative patterns evolve. Some necessary human activities and facilities would create temporary unwanted visual impacts. These would be modified to minimize such impacts.

In order to establish visual management objectives for all National Forest lands, the National Forests are inventoried in five categories ranging from "preservation" to "maximum modification." To date, over 103 million acres (62 percent of the National Forest System) have been inventoried.

The High Bound of the Program continues most present activities that significantly influence the visual resource. Road building in the Pacific Northwest will accelerate, producing a negative effect--especially on steep slopes.

Mining would have adverse visual impacts, but reclamation work and supervision of mineral operations would reduce these impacts. Increased acreage

meeting the Preservation Visual Quality Objective (PVQO) would be partially offset by moving timber production into other (and smaller) areas, thus increasing the impact. Moderate short-term impacts on color and texture of forest landscapes would occur. There would also be moderate irreversible and irretrievable visual effects from earth, rock, and water disturbances. Through 1985 visual quality would improve because of increased acreage meeting the PVQO and because of abilities to preplan vegetative changes. Commodity programs that are increasing would exhibit their major visual impacts after 1985.

The Low Bound Program would decrease the acreage meeting the objective of preservation because it would provide less wilderness acreage. Conversely, the visual impacts of commodity programs would be reduced after 1985 because timber harvest and mineral leasing programs are less than at the High Bound.

Continued National Forest development would introduce slow but continuous change in local visual quality mixes. Most of the changes would be temporary, but some aspects may be of longer duration, and a few would be irreversible. Nevertheless, these changes and impacts are not expected to reduce the total public enjoyment of the National Forests.

Vegetation

Both Bounds of the Program would significantly change the vegetation on some forest and rangelands. Old-growth forests are being harvested rapidly on private lands, and the same process is occurring more slowly on National Forests. Management emphasis on all lands is increasingly aimed at developing and maintaining thrifty, vigorous young stands. In the South on many productive sites, natural regeneration frequently results in a shift from conifers to hardwoods without culture treatment. Wildlife habitat improvement practices are designed to improve habitats of a broad variety of wildlife and plant communities.

The condition of National Forest System rangelands is maintained and enhanced primarily through improved management. In the West, conversion of shrub to grass types and planting of improved forage species continues, although at a rate much slower than in past decades; it is largely restricted to the more productive sites. The emergence of the pinyon-juniper type in the Southwest as a manageable and economically viable forest cover for pinyon nuts, fuel, fenceposts, and range is a noteworthy recent change.

Species and community diversity is increasing especially on rangelands that are improving in condition. On non-Federal rangelands, type conversion and planting of superior forage species is occurring at a rapid pace, especially in the South. Considerable forest acreage in the Central States has been and is still being converted to improved pasture, thereby increasing forage production but decreasing diversity and extent of natural plant communities. ^{39/} Bottomland hardwoods are being cleared for production of soybeans and other crops. Windbreaks and shelterbelts are declining. Overall, increased protection and management are improving the condition of forest and range land.

^{39/} USDA Soil Conservation Service, 1977. Potential cropland study. Statistical bulletin no. 578.

Type conversion.--At both Bounds of the Program there would be conversion of shrub to grass types on the most productive sites in the West, but little or no conversion to grass in the East. Improved forage species would be introduced on depleted rangelands. Control of undesirable species would be confined to the most productive sites. Harvested and catastrophically cleared forest areas on productive sites would be planted to high-yielding trees. Little or no planting would be done in Alaska. Conversion of mixed hardwood-conifer sites to conifers would increase in the South.

Species and community diversity.--Diversity would be maintained primarily through natural factors within the National Forest System, except in the central Rockies and the South where diversity would be maintained through wildlife habitat and timber stand improvement activities. There would be a decrease in diversity on productive sites that are converted to tree species. However, decreases in diversity would be counterbalanced by management efforts to provide ecological niches for a broad spectrum of wildlife. Diversity will be increased on rangelands now in unsatisfactory condition.

On nonindustrial private forest lands, forested areas dominated by one or two species would increase, particularly in the South. Diversity would be maintained through management prescriptions and technical assistance emphasizing multipurpose forests.

Successional stages.--Within the National Forest System, the current distribution of successional stages would generally be maintained in forested areas. The main exceptions are in the South and Pacific Northwest, where early and middle successional stages would be favored. Old-growth vegetative stages will be reduced, especially on productive sites, but would increase in time in Alaska, the central Rockies, and the East as a result of increases in wilderness anticipated by the Program. Late successional stages would be favored on most rangelands.

On nonindustrial private lands, early and middle successional stages generally would be favored in forested areas, and late stages would be favored on rangelands not seeded to high producing exotic species. The acreage of old-growth timber would be reduced. Cutover forest stands would tend to be more quickly planted as a result of accelerated technical and financial assistance, especially in the South.

Wood, herbage, and browse production.--On the National Forest System, the production of wood, herbage, and browse would be enhanced by timber stand improvement activities, especially in the South. Production would be maintained and improved on rangelands primarily through grazing management, but also through cultural practices where these are cost-efficient.

High production on nonindustrial private forests and rangelands would be enhanced by increased technical and financial assistance.

Short-term effects.--Range conditions would slowly improve Nationwide, with more rapid improvement in the Southwest. Acreages of plant and animal communities associated with old-growth forest stands would decrease as these stands are harvested. Diversity would tend to decrease on productive forest sites that are planted to high-yield tree species.

Long-term effects.--Range conditions would continue to improve. Plant and animal communities associated with early successional stages would be promoted.

Communities associated with mature stands and late successional stages on forest lands would be confined largely to Alaska, the Central Rockies, and designated wilderness areas.

Cultural Resources

The Program is shaped in part by the need to protect nonrenewable heritage resources--reminders of our prehistoric and historic past. The major emphasis is on compliance with the substantial body of laws, executive orders, and regulations designed to protect cultural resources. Protection efforts include discovery and inventory of sites, evaluation of significance, and mitigation of potential adverse impacts. More than 1.4 million acres in potentially impacted areas have already been identified by the Forest Service to protect cultural resources from deterioration, vandalism, and ground disturbing activities. Over 6,000 sites were protected on the National Forest System in 1979.

The High Bound of the Program would enhance and interpret cultural resources on National Forest System land and protect sites and properties impacted by Forest Service activities. There would be potential adverse impacts due to increased visitor use, and possible conflicts with increased minerals and fish and wildlife programs. Road, trail, and recreation construction would generate increased professional evaluation of cultural resources and mitigation of adverse effects. High levels of recreation use levels would increase management, including enhancement, protection, and interpretation. Increases in land-disturbing activity and emphasis on dispersed recreation would create needs for added protection. Timber management activities will continue to be the greatest resource conflict. Increased protection and interpretation would be provided. High minerals output could create some adverse impacts despite mitigation efforts.

The Low Bound of the Program would meet assigned forest output targets and minimum requirements necessary to protect cultural resources. Inventory for cultural resources would be project-oriented and at a level necessary to satisfy the intent of the appropriate laws and regulations. Interpretation of prehistoric and historic values would be limited to the most outstanding and significant examples. Nominations to the National Register of Historic Places would be minimal.

Non-project protection would be limited to investigation and enforcement in cases of actual thefts. Prevention of vandalism and thefts would be a shared responsibility with other program activities such as fire prevention. Public education and internal training would be minimum.

Cultural resource planning would be done as part of forest plans. Cultural resource overviews would be done only where cultural resources are an identified issue or concern and overview information is necessary for the selection of the appropriate management alternative.

Social Effects

The Program would have two general types of social effects: those affecting the population as a whole, and those affecting persons living in nonmetropolitan counties dependent on Forest Service programs.

The High Bound of the Program would provide for increased recreation use in all Regions. While such increases might no more than keep pace with the rising proportion of the population now seeking forest-based outdoor recreational opportunities, leisure opportunities of the population in general would increase.

At the Low Bound, the Program would reduce quantity and quality of services to support recreational opportunities on National Forest System land in all Regions through 1985, then increase them above current levels by 1995. Therefore, the quantity and quality of services to support the Forest Service's share of leisure opportunities would not keep up with population increases or rising demand for leisure opportunities. However, there would be increased opportunities for private recreational development. In the western Regions, residents of both metropolitan and nonmetropolitan areas would have decreased quantities and quality of leisure opportunities. In the South, residents of metropolitan areas would experience greater impact than residents of nonmetropolitan areas. In the North, there would be little impact in metropolitan areas but residents of some nonmetropolitan market-dependent areas would experience some decline in services for leisure opportunities.

Energy shortages would require energy-efficient access to recreation developments for urban residents. The impact of building trails, roads, and other facilities along with retail services and transportation is much greater on a small and relatively isolated community than on one close to a city. Recreation programming for a region can be shifted to increase opportunities closer to population centers. It can also provide for vacationing units that will stay in one place longer. The localized effect may be to change resident lifestyles near new recreation developments and to increase commercial activities.

The High Bound of the Program would have a stabilizing effect on timber-related aspects of the economy and on timber-dependent communities. The increases in timber harvesting would not produce any sudden disruption. As with the recreation program, the increase is more or less proportional to population changes except where short-term departures are approved. The overall effect should be positive to the economy and encourage stability of populations, employment, taxation, and communities in timber-dependent areas, especially on the West Coast where production from nonpublic lands would decrease significantly during the next 20 years.

At the Low Bound of the Program timber sales would decline to 11.0 billion board feet by 1985 and would not increase until after 1990. Effect on timber-related aspects of the economy and timber-dependent communities would be small, except in the Pacific Northwest and parts of the South. In most of the South, dependence on nonindustrial private forests is high and effects of National Forest policies are relatively small. In local areas dependent on National Forests there is potential for considerable impact on community economy and community context. In the Pacific Northwest, there is a potential for mill closings in metropolitan areas dependent on National Forest System timber.

Conflicts among timber harvesting, recreation use, water use, and wilderness preservation may continue. However, the stability given to the economies

of the timber-dependent areas and associated benefits for employment opportunities, the tax base for education, and other services, and community contexts overshadow possible adverse impacts.

At the High Bound of the Program, range use on National Forest System land would increase by about 200,000 animal unit months above current levels by 1995 while at the Low Bound range use on National Forest System land would decline by about 600,000 animal unit months by 1985 and then increase to current levels by 1995. Because the National Forest System supplies only about 5 percent of the total animal unit months of range use, this decline would have little effect nationally. However, in the West there would be a negative impact on some communities and on land tenure as marginal family operations are impacted, particularly those that are especially dependent on National Forest System rangeland to carry animals through a portion of the year.

For the most part, negative impacts related to mineral development at both Bounds would tend to be localized and related to boom conditions. While there will continue to be some crowded recreation areas, they too would be site-specific and close to user populations. Mitigation actions are planned to offset these and other adverse impacts.

Effects of the Program on the national economy were estimated with an input-output (I/O) model. 40/ Within the context of the I/O model, the Program is described as a set of 16 key outputs and two expenditure variables. A majority of the key outputs represent quantities of raw materials, such as timber, minerals, forage, etc., required in the production process. Given the interdependence of industries within the economy, a change in the availability and location of raw materials can affect the overall level of economic activity. The purpose of the I/O model is to provide a comparative analysis, rather than a prediction of actual economic activity in the future.

Three social-economic indicators of income, value added and employment are used to monitor comparative changes in the level of economic activity. These indicators include both direct and indirect effects. Direct effects are those on industries working directly with raw material resources like timber, range, and minerals, or with forest users (retail selling to recreation participants is an example). Indirect effects are those on industries which support the direct industries (service stations selling gas to ranchers is an example).

Both Bounds of the Program would provide for expanded economic activity by 1995 (table 1.34). The Low Bound would provide decreases in the short term, however. In 2025, employment would increase by approximately 230,000 at the Low Bound and 550,000 at the High Bound.

State and Private Forestry

The social effects of the Program for State and Private Forestry are in many respects similar to those associated with National Forest System programs. The State and Private Forestry program impacts are greatest in the East. Increased assistance for timber harvest would affect employment, income

40/ USDA Forest Service, 1979. The 1980 RPA economic input-output model development, usage, and results. Unpublished report on file with the USDA Forest Service, Washington office.

to forest landowners, taxes, and community and forest industry stability. Emphasis on multiple forest resources, including recreation, and wildlife habitat, will increase dispersed recreational opportunities. Cooperative assistance in rural fire prevention and control influences investment risks for agricultural crops, livestock, and property; it also protects human lives. Forestry assistance for urban areas and communities would provide information about forestry opportunities and benefits of trees to urban residents.

Table 1.34.--Social/economic impacts of the Recommended Program

Indicator <u>1/</u>	Time Period						
	1981	1985		1995		2025	
		High	Low	High	Low	High	Low
Income (million \$)	14,000	17,000	13,450	21,000	17,000	26,000	19,000
Value Added (million \$)	15,400	18,100	14,600	23,100	18,500	28,000	20,400
Employment (1000 persons/year)	700	820	660	1,040	830	1,250	930

1/ Income - Compensation to the household sector for inputs provided to the purchasing industry. Includes wages, salaries, profit, rents, royalties, etc.

Value Added - The value of all primary inputs (payment for land, labor, and capital) used in the production of products sold.

Employment - Measured in person-years for approximately 2,000 hours of work. This may be filled by one person working year long or several people working a portion of the year.

PART IV: RECOMMENDED PROGRAM DIRECTION CHANGES, MAJOR ISSUES, AND THE CURRENT PLANNING SITUATION

This part highlights differences between the 1975 and the 1980 Program. It also identifies major policy issues that were resolved, and situations that led to changes in direction in the 1980 Program.

Differences between the 1975 and 1980 RPA Recommended Programs

The 1980 Program differs significantly from the 1975 Program. Some differences result from policy issue resolution. Others are caused by new economic information on relative program efficiencies. Still others are due to changing conditions, such as a reduction in the commercial forest land base, new laws affecting resource allocations and uses, and an attempt to balance the national budget to stem inflationary and recessionary problems in the economy.

National Forest System

Both Bounds of the 1980 Program would provide forage for livestock at slightly higher than present levels. In comparison, the 1975 Program established a course toward meeting the current share of the projected demands for increased range grazing by the year 2000. It required increases of about 80 percent in the amount of forage to come from the National Forest System. The decision for the High Bound of the 1980 Program was to manage range grazing at economically efficient levels which rise only slightly above 1981 output levels as ranges are improved. This decision is based upon evaluation of range program costs and benefits that indicated negative investment returns on any major expansions.

The Administration's recommendations to add 15.4 million acres to the Wilderness System would provide important wilderness opportunities. The present commitment would increase wilderness acreage from the 25-30 million acres projected in 1975 to 34-42 million acres in this Program. This increase would provide for a more extensive and diverse distribution of wilderness throughout the country, enabling more Americans to experience a wilderness setting. There would be a greater diversity of ecosystems, including habitats for wilderness-associated wildlife. Additional wildernesses would further promote the intent of the Wilderness Act of 1964 to provide recreational, scenic, scientific, educational, conservation, and historical use values for the American people.

The 1975 Program provided for moderate increases in timber sales offerings, but more than doubled offerings in the Rocky Mountains and Alaska. A more detailed economic analysis revealed that the cost of increasing timber production in the Rocky Mountains outweighed the direct benefits of such an increase. A direct comparison of the two Recommended Program output levels at four comparable points in time is shown in table 1.35.

Table 1.35.--A comparison of the 1975 and 1980 Programs,
timber element

Timber offered for sale	Change from 1975 Program to 1980 Program			
	1985	1995	2005	2015
Volume (billion board ft. local scale)				
High Bound	-2.9	-3.0	-2.8	-2.6
Low Bound	-4.4	-4.2	-5.0	-5.4
Percent Change				
High Bound	-19	-18	-16	-14
Low Bound	-29	-25	-28	-29

Anadromous fish and endangered and threatened species would receive increased emphasis. The potential of the National Forest System to economically increase its contribution to the Nation's protein food supply by about 25 million pounds annually has been recognized and given special emphasis at the High Bound. The listing of additional endangered and threatened species in the Federal Register, together with more stringent requirements for consultation with the U.S. Department of the Interior--Fish and Wildlife Service, has led to additional emphasis in the wildlife and fish program segment. Better resource inventory has caused some downward adjustment in targeted habitat improvements in the High Bound program, and much lower in the Low Bound program as compared to the 1975 Program.

The 1975 and 1980 Programs can also be compared on the basis of their present net worths. Because constraints on land use have changed in the last 5 years, Alternative Program Direction 3, which reflects such changes, can be used as a proxy for the 1975 Program. For the 50 years 1981 through 2030 at a discount rate of 7-1/8 percent, the present net worth of Alternative 3 (1975 Program) is estimated to be \$44.9 billion. Present net worth for the High Bound of the 1980 Program is estimated to be \$48.9 billion, and for the Low Bound, it is estimated to be \$47.5 billion.

State and Private Forestry

State and Private Forestry planning has been improved significantly since 1975. The new Program reflects alternatives developed from the field level up to the national level. Thus, the State forestry agencies, the organizations through which cooperative forestry programs are delivered to landowners, have participated fully in the RPA process and contributed basic resource data, goals, and issues at the regional planning level. The increase in State involvement has strengthened the 1980 Program for State and Private Forestry.

Among the alternatives developed for 1980, Alternative 3 is basically a continuation of the 1975 Program. The High Bound of the 1980 Program is, in general, comparable to this Alternative. Some notable changes include decreases in cooperative fire protection and urban forestry, and increases in wildlife habitat improvement, timber assistance, and State forest resource

planning. The total Program level is lower in the 1980 Program than in the 1975 Program due primarily to reductions in protection, most notably rural fire prevention and control, and urban forestry.

It is difficult to forecast insect and disease problems, and fire risks and hazards especially since the existing programs are designed to prevent such problems or reduce them to below current levels. Therefore in the 1980 Program, cooperative forest insect and disease management and rural fire protection programs are projected forward based on present levels. The levels of these protection programs would rise gradually in the early years at the High Bound but remain at the 1981 level through 1985 at the Low Bound. Insect and disease outbreaks, fire risks and hazards, and new strategies to increase program effectiveness will be carefully evaluated year by year, and the Program will be adjusted accordingly to improve effectiveness.

The 1980 Program does not include financial assistance to State or local governments for urban forestry. However, the Forest Service would continue to provide new knowledge and technology that is relevant to improving urban forest benefits. The Forest Service would continue to provide technical expertise, guidance, and coordination to State forestry agencies at the High Bound. At the Low Bound urban forestry assistance would be eliminated. Pilot testing promising research results, demonstrations, and special projects would be provided through the technology implementation program.

The major increase in emphasis of the 1980 Program over the 1975 Program for State and Private Forestry will be for increased wood production from non-industrial private forest lands. These lands, especially those in the South, must be the source of any significant increase in softwood timber supply. Although the inventory of southern pine has increased in recent years, much emphasis is needed to offset the shortfall in pine acreage regenerated to pine following harvest. The Program significantly increases emphasis on regeneration after harvest. To assist private landowners in making management decisions, a market information and price reporting system would be developed. Assistance to States for upgrading nurseries, seedling production, and tree improvement would be continued.

The 1980 Program for technical assistance would emphasize expansion of hardwood utilization through improved technology and information, use of wood as an energy source, and improve hardwood management. Utilization specialists will increase efforts to improve timber harvesting, primary and secondary processing, marketing, and use of wood residues for energy production. A major hardwood utilization initiative is intended to increase the use of low-quality hardwood, and thereby improve the quality of hardwood stands available as a future resource. A program with a similar objective involves cost-sharing and technical assistance for landowners to improve existing stands through thinning and sale of the removed wood for fuel.

The 1980 Program includes financial and technical assistance for State forest resource planning. The Cooperative Forestry Assistance Act of 1978 emphasizes the importance of this program and authorizes assistance to State forestry agencies for natural resource planning at the State and Federal level. This State planning contributes significantly to RPA planning.

Research

The 1980 Program for Research is based upon the Assessment findings and regional and national planning efforts that were conducted in 1977 and 1978. At the High Bound, research efforts would be greater than proposed in the 1975 RPA Program while at the Low Bound, they would be about 20 percent below the 1975 Program. A number of initiatives were identified during planning that had not received sufficient attention in the 1975 Program. These were prioritized, and the 23 highest priority initiatives were added into the 1975 RPA Program to arrive at the 1980 High Bound Program. At the Low Bound, these initiatives would be phased into the current program more slowly than at the High Bound. Research programs in all resource areas in the 1980 Program, compared to the 1975 Program, would be strengthened to more rapidly provide new technology related to forestry.

Human Resource Programs

There have been two significant additions to the Human Resources Program since the 1975 Program. The change with the greatest impact was the implementation of the Young Adult Conservation Corps (YACC) program. In fiscal year 1979 the YACC program served 28,310 enrollees who accomplished 6,689 person-years of resource conservation work valued at \$89.8 million. The second significant change was the removal of the \$100,000 limit placed on use of Forest Service funds to support the Volunteers in National Forests Program. With removal of this limitation the Forest Service can now make unlimited use of this rewarding and cost-effective program to help accomplish program objectives in other resource elements.

Major Policy Issues

The Resources Planning Act requires an analysis of the effectiveness and efficiency of Forest Service programs in meeting the renewable resources needs and opportunities of the Nation. The RPA process also provides for identification and consideration of specific policy issues, and for formulation of programs to deal with them.

The major policy issues considered during formulation of the Recommended Program are described below, along with the ways in which the Program responds to policy directions of the Administration.

Some policy directions require changes from the current program. Some influence the level of outputs and funding scheduled in the Program. Some provide continuing direction to the Forest Service and other cooperating USDA agencies as the Program is implemented. And some require special followup actions such as additional studies, coordination with other agencies, and short-term, noncontinuing activities.

The issues and directions highlighted here represent the culmination of lengthy, in-depth consideration, including staff analyses, public comment, and high-level participation and guidance from within the Forest Service and policy-level decisions in the U.S. Department of Agriculture. 41/

41/ Detailed issue papers were prepared for each policy issue and are on file with the USDA Forest Service, Washington Office.

Production of Wood from Private Nonindustrial Forest Lands

Policy question.--How should Forest Service programs support development of wood production from nonindustrial private forest lands?

Policy direction.--Forest Service programs will provide for: (1) marketing information; (2) developing an analytical base for improving the cost-effectiveness of existing assistance programs; (3) continuing current levels of technical and financial assistance until additional data on program effectiveness are developed that justify change; (4) pilot forestry loan programs (subject to congressional authorization); and (5) study Federal, State, and local tax policies for consistency with national timber policies and the potential for further incentives to encourage increased production.

Program actions.--A special effort would be made under the Program to develop and implement a marketing information and timber price reporting system. Using expertise of other USDA agencies that now report crop production and prices, and in coordination with related efforts in the private sector, the new system would be designed to provide readily accessible up-to-date, accurate information for timberland owners and operators. The system would be started and tested in the South and expanded to the Nation as trial and evaluation permit.

Most State and Private Forestry cooperation results in intermediate outputs and effects that are difficult to measure on a strict economic basis, especially in terms of immediate short-term market outputs. In recognition of the need to develop a better analytical base for State and Private Forestry programs, a special effort would be made to strengthen the input data and the analysis for the 1985 Program. This effort would be led by a senior economist on the staff of the Deputy Chief for State and Private Forestry with assistance from economists in each major program area.

The Program would continue to provide technical assistance until additional data on program effectiveness of initiatives for increasing timber supplies are determined or verified; in the South financial as well as technical assistance would be provided for pine reforestation.

Renewable resource evaluation would continue to provide information on regeneration and stocking of forest lands after harvest.

The Program provides for continuing cooperative efforts with other USDA agencies and with the Department of the Treasury to explore the desirability and feasibility of forestry loan programs, and consistency of Federal, State, and local tax policies with national timber policies.

In addition to Federal technical and financial assistance, taxation and regulatory policies of Federal, State, and local governments also directly influence timber management and utilization. Some States have also established cost-sharing programs to encourage replanting, for example. Full realization of national timber goals requires the coordination of these policies and programs at all levels of government.

Increasing Softwood Products from National Forest System Lands

Policy question.--How much can the Forest Service increase production of wood and wood products from National Forest System lands within environmental and multiple-use constraints? Might such increased supplies slow long-term upward price trends?

Policy direction.--Modify present policy to include the President's directive 42/ to update land management plans on selected National Forests with the objective of increasing in the 1980's, the harvest of mature timber through departure from the current nondeclining even-flow policy. Carefully consider timber tradeoffs made in land allocation decisions as part of land management planning. Commensurate with these actions, Forest Service programs will provide for increased investments in intensive timber management, with priority on better sites to the extent that such investments contribute to net benefits measured by the value of the additional timber produced, compared with the costs, all appropriately discounted.

Program action.--The Program is responsive to increasing softwood production from the National Forests. Softwood production would increase on the Pacific Coast, northern Rocky Mountains, and the South, where such increases are cost-effective. It would not decline in any Region but Alaska.

The President's directive stipulates that departures from the nondeclining even-flow policy will be considered in accordance with current laws, regulations, and environmental constraints. Land management planning procedures will be used to identify options for softwood timber production increases. This planning will be done as rapidly as possible. Forty National Forests have been identified by the Forest Service where departures may be a viable option. Sixteen of these forests, identified in part 1 (departures from nondeclining even-flow) have been selected for accelerated planning. The extent of possible departures and the timber volumes and tradeoffs involved will be known when each National Forest plan is prepared and departure considered as an alternative in the Forest plan where appropriate.

Research would provide new knowledge and techniques for improved slash and residue removal and utilization, improved lumber and grade recovery from dead timber, improved information about allowable stress in softwood lumber or glued structural members, and new knowledge and technology to reduce regeneration delays.

Systems would be identified and developed for improving land management planning and its component parts, improving techniques for the acquisition and analysis of data used in planning and monitoring and improving management of planning activities.

Economical timber harvesting systems would be developed for thinning operations and for harvesting small, low-value trees while minimizing logging damage to residual crop trees. Harvesting systems for short-rotation intensively managed stands would be developed and used where consistent with multiple-use objectives. Programs would be developed to test the feasibility of whole-tree use in manufacture of composite panels or framing products.

42/ Memorandum from the President to the Secretary of Agriculture.
June 12, 1979.

Wood Fiber as an Energy Source

Policy question.--What cost-effective opportunities exist in development of wood fiber as an energy source and what role in wood energy should the Forest Service pursue?

Policy direction.--Forest Service programs will be expanded beyond current activities to contribute to the national goal of increasing the use of wood for energy from the 1-1/2 quadrillion British thermal units (quads) used today to 5 quads in 10 years.

Program actions.--The Program is very responsive to increasing wood supplies for energy through National Forest System management, State and Private Forestry cooperation, and Research.

Wood for energy is primarily dependent upon the utilization of residues. Intensive management practices required to increase timber production under the Program would increase logging residues from thinnings and regeneration harvests on National Forest lands. Also, large amounts of wood for energy may be generated by thinnings and other needed cultural work that improve the quality and growth of residual stands.

State and Private Forestry programs would include development, demonstration, and application of cost-effective activities for harvest, transportation, and use of wood for energy. Most of the potential for the cooperative programs is in the form of unused wood residues. Much of the residue resulting from logging, tree mortality, cull trees, noncommercial timber, urban wood wastes, land clearings, and forest industry wastes can be recovered for energy use, with resultant improvement in forest management.

The early success of a pilot project in New England suggests that assistance to landowners for timber stand improvement with the intermediate production of fuelwood has significant potential.

Improved utilization of wood would reduce the amount of wood residues left during harvesting operations, and increase the use of forest industry residues for energy production. In addition to forest industry, other potential users of large volumes of wood for energy include the brick and cement industry, public and private institutions, and municipal power generation plants. Home heating with wood is rising dramatically--especially in New England where hardwood is plentiful and energy costs are especially high.

Portions of several ongoing research projects have energy-related components or outputs. In addition, the Forest Service receives substantial "pass-through" funds from the Department of Energy for cooperative energy studies related to forestry.

Research in the following areas would develop knowledge about wood for energy systems: biomass assessment, residue harvest and delivery systems, improved forest management including intensive culture, production of petrochemical substitutes from wood, fuel and gas derivatives, environmental impacts, and conservation in production and conversion. The primary goal will be to increase the contribution of wood residues to national energy needs.

Management of Hardwoods

Policy question.--Should Forest Service programs be established which emphasize management of the hardwood resource? (Utilization and technology of hardwoods are considered as a separate issue.)

Policy direction.--Forest Service Research and State and Private Forestry programs will provide for detailed resource information and will provide marketing assistance and price reports. Other hardwood programs will remain at present levels until increases can be justified on a cost-effective basis.

Program actions.--In association with increased production of wood from nonindustrial private lands, State and Private Forestry would make a special effort to develop and implement a marketing information and price reporting system that will include both hardwoods and softwoods. Emphasis would also be given to improving hardwood management technical assistance.

Utilization of hardwoods for energy offers an opportunity to improve stands for faster growth of quality sawtimber. However, it also poses the risk of liquidating valuable growing stock if adequate technical assistance and educational programs are not made available to landowners.

Research would improve methods for inventorying the hardwood resource and for managing hardwoods in order to improve both quality and volumes of timber and other resources produced in hardwood forests and renewable resources evaluation reports would provide more detailed data on location and characteristics of hardwood inventories.

Improved cost-effective methods for managing hardwoods would continue to be developed to encourage hardwood management, and to improve productivity of hardwood stands. Benefits will include increases in quality and volume of hardwoods for products and energy and improved production of nontimber benefits in hardwood stands.

Export and Import of Raw Logs

Policy question.--To what extent should the import and export of raw logs be controlled? (This question is restricted to the export of softwood logs from the West since that is where most of the controversy and exports occur.)

Policy direction.--The present policy of maintaining restrictions on log exports from Federal lands will continue in support of local employment and in response to public comment.

Program actions.--Exports of softwood logs and lumber under the Program would not substantially vary from the amounts that would be exported under a continuation of present trends.

Softwood imports, specifically softwood lumber imports from Canada, would increase until about the year 2000 but would be reduced over the long term under the Program.

Renewable resources economics research would continue to supply information about the import and export of raw logs.

Pesticide Use, Research, and Registration

Policy question.--What should be Forest Service policy for pesticide use, research, and registration to achieve management goals?

Policy direction.--Present policies will be continued whereby pesticides are used only when deemed essential to meet management goals, and to develop, practice, and encourage the use of integrated pest management (IPM) methods.

Program actions.--The Program for the National Forest System and State and Private Forestry would emphasize the use of the most biologically sound, least hazardous, and environmentally safe pesticides deemed necessary to reduce major forest resource losses caused by insects, diseases, unwanted vegetation, and animals.

The upper limit of the recommended range of timber production may not be achievable, particularly in the Pacific Northwest and Southeast, without the use of herbicides.

Specific State and Private Forestry actions would include technical assistance for the incorporation of IPM alternatives, training, certification of applicators to use restricted-use pesticides, proper storage and disposal of pesticides, and coordination required by the National Environmental Policy Act.

Research would develop new knowledge and build upon existing knowledge in basic, applied, and systems components of IPM for prevention or suppression of unwanted vegetation, and insects and diseases such as larch casebearer, mountain pine beetle, wood decay, fusiform rust, dwarf mistletoe, and seed and cone insects and diseases.

User Payment for Recreational Opportunities

Policy question.--To what extent should the Federal Government require users to pay fees for the use of federally financed recreational opportunities on National Forest System lands and on all Federal lands?

Policy direction.--The Forest Service will work toward increasing user fees, to bring them in line with actual direct costs and to reduce competition with the private sector.

Program actions.--Forest Service receipts from current recreation fees equal about 40 percent of the National Forest System operation and maintenance costs at recreation sites where fees are charged. It is intended under the Program to implement management actions that would result in increasing receipts to recover more of the operation and maintenance costs of charge sites and reduce competition with the private sector.

Research would develop an understanding of the factors that influence recreation demand and the associated costs of providing and maintaining recreation opportunities.

Alternative Means for Financing Capital Development on National Forest System Lands

Policy question.--Should cost-effective capital improvements on the National Forest System continue to be financed through the traditional processes, or should the U.S. Department of Agriculture recommend some alternative approach that is fiscally feasible and that might improve the effectiveness and administration of National Forest programs?

Policy direction.--The Forest Service will continue to rely on traditional sources, but it also will continue evaluation to determine whether any alternative financing modes would provide significant increases in the net worth of National Forest programs not attainable by traditional methods.

Program actions.--Evaluations by the Forest Service in cooperation with others would determine whether any alternative financing modes can provide significant increases in the net worth of National Forest programs not attainable by existing methods.

Recreation Development on National Forest System Lands

Policy question.--What should Forest Service policies be on the use and development of National Forest System lands for recreation purposes?

Policy direction.--The Forest Service will continue current recreation policies with modification of management emphasis as one way to respond to the anticipated needs of the 1980's. New emphasis will be placed on energy efficiency in recreation use and development including making recreation opportunities on National Forest System lands more accessible, usable, and enjoyable for urban residents.

Program actions.--The National Forest System would emphasize three specific actions. First, new recreation facilities would be located to utilize energy-efficient transportation systems where possible to encourage use by urban residents. Second, energy-efficient transportation systems serving National Forest System areas would be encouraged and supported by coordinating facilities and programs with the private sector and local chambers of commerce and public utility districts. Third, visitor interpretive services would be used to promote energy efficiency and to inform urban residents of recreational opportunities within the National Forest System.

Research would develop knowledge and technology to enhance the quality and quantity of recreation experiences available to the public within constraints imposed by energy scarcity. It also would improve systems to measure recreation use, develop methods to forecast trends in demand for dispersed recreation, and devise approaches to more effectively integrate management for recreational opportunities with production of other resource values. Research would also provide technology to manage urban forests to optimize recreation opportunities near population centers.

Eastern National Forests

Policy question.--Should multiresource outputs from eastern National Forests be increased to respond to public demands? Can increases in outputs

be accomplished by a clear and explicit declaration of a strong commitment to meet Eastern needs and opportunities through adjustments in programs, policies, and management?

To what extent do increases in resource outputs to meet public demands and expand public benefits require speeding up land acquisition to round out the Eastern National Forests?

Policy direction.--The Forest Service will continue the present policies of administrative decentralization utilizing land management planning systems consistent with National guidelines.

Program actions.--Land resource and management planning will be completed by 1985.

Land acquisition needs would be assessed and identified through an analysis of management and protection alternatives, consistent with the Forest Service's land management planning process and the appropriate Land and Water Conservation Fund (L&WCF) Policy Group guidelines. L&WCF purchases would be sustained until 1989 when the program ends. Purchases from regular (Weeks Act) funds would emphasize acquisitions in the eastern National Forests.

Research would identify and develop systems for improving the overall planning process and its component parts, the techniques for the acquisition and analysis of data used in planning and monitoring, and the management of planning activities.

Forage for Domestic Livestock

Policy question.--How should the Forest Service develop and manage the forage resources on the National Forest System for use by domestic livestock?

Policy direction.--The Forest Service range program will emphasize improvement and maintenance of land productivity for grazing and other resource uses consistent with production efficiency and market value of forage. It also will provide forage resources to improve the quality of life for low income families, minorities and related communities. In addition, emphasis will be placed upon research, development, and application of livestock grazing programs on National Forest System lands to encourage livestock production on private forested ranges.

Program actions.--The National Forest System would emphasize the achievement of five objectives. First, in the long run, forage production would be maintained at about current levels. Any increases would be a result of improvements on cost-effective sites that are designed to bring range use into balance with ecosystem stability. Lands that cannot efficiently sustain grazing in equilibrium with ecological considerations would be shifted to other multiple uses. Second, a fee structure would be developed and maintained to bring fees into balance with the market value of forage. Third, forage would be provided to improve the quality of life for minority individuals dependent on National Forest System range. Fourth, National Forest System lands would be used to demonstrate range management techniques that are appropriate for use on private lands. Fifth, appropriate adjustments would be made to accommodate regional differences in productivity, and relative investment and management costs.

Research would develop knowledge to permit wise use of rangelands with emphasis on revegetation, restoration of range ecosystems, enhancement of productivity and integration of livestock and forage production with other range resource benefits. Methods for measuring specific social benefits would also be developed.

Mineral Development on National Forest System Lands

Policy question.--What actions should the Forest Service take to facilitate exploration and development of energy and nonenergy minerals on National Forest System lands?

What should be the role of the Forest Service in research and development to protect, restore, and rehabilitate lands disturbed by surface mining activities?

Policy direction.--The Forest Service will expand its capabilities to accelerate mineral exploration on National Forest System lands. The review process of withdrawn lands will be accelerated through land management planning. Emphasis will also be placed on supporting the modification of the 1872 Mining Law. The Agency will continue research programs to develop and apply methods for mining and reclamation and to provide technical assistance and cooperate with other Federal, State, and private land managers.

Program actions.--The Forest Service would develop three mineral models dealing with occurrence, exploration, and development of mineral values to facilitate identification of areas of mineral potential during the planning process. This would in turn permit more rapid processing of applications for leases and permits since it would increase the Forest Service knowledge of all the resource values present.

A system would be implemented that establishes time limits for Forest Service processing actions on applications for permits and leases and for approving operating plans that will accelerate exploration. A system would be implemented for formal scheduling of leasing decisions, for notification of interested parties as to actions taken, and for notification of the applicant's right of appeal of an unfavorable decision.

The Forest Service would implement, as a condition for lease approval, a stage-by-stage development process for geothermal leases. This would require a detailed environmental review for each stage. Exploratory or development work would be permitted only on that stage for which environmental studies are complete. Negative findings (of geothermal resources of significance) during any stage may preclude advancement to the succeeding stage and require additional environmental studies.

Under the Program, which directs emphasis on processing mineral permit and lease applications, there would be more intensive analysis of environmental consequences of proposed actions. This would result in greater protection of surface resources.

During the land management planning process all lands previously withdrawn from mineral activities would be restudied to determine whether they are needed for the purpose for which they were withdrawn or whether they can be returned to multiple-use management.

Research would develop knowledge necessary to meet environmental concerns while permitting use of subsurface mineral resources. Surface mine rehabilitation recommendations must be refined and expanded to meet challenges posed by increased mining in the West to support substitution of coal for petroleum and synthetic fuels development, and the development of other resources such as uranium, phosphate, and oil shale. Research would develop new knowledge for updating reclamation guidelines for eastern mines where new regulations have outdated previously acceptable reclamation research information.

Expanding Wood Supplies through Improved Technology and Utilization

Policy question.--What opportunities for increasing utilization of the Nation's wood resources should the Forest Service consider? In which ways and to what extent can existing and emerging technology increase softwood supplies and reduce softwood demands in the 1980's and 1990's?

Policy direction.--The Forest Service will accelerate its research, development, and application programs to expand wood supplies through improved technology and utilization. New utilization technology is viewed as the most cost-effective way to increase future softwood timber supplies. Where efficient, National Forest System timber sale policies would be modified to encourage increased utilization.

Program actions.--Research would develop methods to economically utilize low quality and small-diameter hardwood trees that can substitute for softwoods, create new knowledge for improved softwood slash and residue removal and utilization, improve lumber and grade recovery from dead timber, and improve information about allowable stress in softwood lumber and glued structural members.

Information would be developed on the total forest biomass available on commercial forest land, and programs would be implemented to test the feasibility of whole-tree use in manufacture of composite panels or framing products.

National Forest System utilization standards would be revised to recognize improved logging and manufacturing technology to meet multiple-use objectives including increased timber supplies from the National Forests. In addition, increased softwood harvest and manufacturing residues in the Pacific Northwest would reduce the diversion of sawlogs to the pulp and paper industry.

State and Private Forestry forest products utilization programs would provide technical assistance to emphasize the application of technology to improve harvesting, processing, and use of wood and wood-based products. Utilization specialists would provide assistance in a broad range of activities, from timber harvesting through primary and secondary processing and marketing, to encourage and induce improved wood utilization. Improved utilization of eastern hardwood would be stressed to increase the use of low-quality hardwood with resulting higher quality hardwood stands available as a future resource.

Forest Service Emphasis on Wildlife and Fish

Policy question.--What emphasis should be placed on wildlife and fish resources in National Forest System, State and Private Forestry, and Research activities?

Policy direction.--The Forest Service will increase its emphasis on wildlife and fish in the management of the National Forest System by establishing specific species targets that can be achieved in a cost-effective manner. Other forest landowners will be encouraged to practice multiple-use management. The Agency will encourage the consideration of wildlife in the development of State comprehensive forestry plans.

Program actions.--The wildlife and fisheries program for the National Forest System would emphasize the protection of endangered and threatened species. Anadromous fish, wildlife, and fish population also would receive attention. Population targets are approximated in terms of habitat capability index for a few management indicator species.

Nonindustrial private forest landowners are becoming increasingly interested in managing their properties for wildlife values. As one of the multiple-uses for which technical assistance is provided in cooperative forestry programs, wildlife habitat management would receive increasing emphasis through technical assistance. This would occur principally through inclusion of wildlife in multiple-use forest land management plans prepared for landowners by State agency foresters. On a larger scale, comprehensive forestry plans are being developed for entire States. State agencies will be encouraged to give detailed consideration to wildlife in these plans.

Research would develop knowledge to minimize the adverse effects of forest and range activities on fish habitat. Knowledge would be developed about specific habitat requirements of endangered or threatened species. Knowledge would be provided to properly manage, maintain, and/or increase the habitat for selected groups of nongame wildlife populations.

The Current Planning Situation

Forest Service planning today is in many respects different from the situation in 1975 when the first Recommended RPA Program was developed. This section describes some of the changes as well as ongoing coordination with other planning efforts that influenced the development of the 1980 RPA Recommended Program.

National Forest System Planning

The Forest and Rangeland Renewable Resources Planning Act of 1974 as amended by the National Forest Management Act of 1976 (NFMA), provides statutory direction on the preparation and revision of National Forest System land and resource management plans. National Forest and regional land and resource plans establish long-range priorities and guide program execution. The RPA requires public participation in the development and revisions of the plans. The regulations require that plans must be revised at least every 10 years.

To meet RPA requirements, Regions will provide resource capability information for the Assessment, apportion a range of RPA Program targets to individual National Forests based on their capabilities to meet the demands for various goods and services, and coordinate with State and other agencies' planning efforts.

The relationship between the RPA Program and land management planning is established by regulations 43/ promulgated as directed by Section 6 of the RPA, which required formulation of a coordinated and detailed planning system. In essence, this is a refinement of processes that have been evolving within the Forest Service for many years. Some key characteristics are:

- Based on the current Program, each Regional Forester will prepare a regional plan that provides direction and allocates targets among National Forests in the Region.
- Program targets for each National Forest and Region will be allocated according to resource capability, relative efficiency of production, environmental constraints, and other factors.
- This direction and allocated targets, along with local information on capabilities and results of evaluating an expanded range of options, will guide preparation of individual Forest plans for accomplishing or revising the assigned targets.
- Based on the National Forest inventory, units of land will be identified from which combinations and ranges of outputs could be produced. As provided by Section 6, direction to National Forests will provide for investigation of a wider range of output schedules than expressed in the Program targets (table 1.1). In doing this, the total land base will be considered with appropriate constraints placed on lands legislatively or administratively withdrawn.
- Benefit-cost analyses, showing the relative efficiency of production from each resource or group of resources with similar characteristics, will be prepared.
- Environmental effects of the National Forest plans will be estimated.
- Forest plans will identify major issues and demonstrate responsiveness to them.

National Forest plans will reevaluate and document current local resource capabilities with respect to changes occurring in the planning situation since the last RPA Program of record. This information will be used in preparing the RPA Assessment. The Assessment will be used in developing the next RPA Program. In accordance with RPA, Forest planning will be completed by 1985.

Approved plans will be implemented immediately. In addition, this broad scale consideration for all resource outputs in National Forest planning will provide a complete array of alternatives to use in developing the 1985 RPA Program. The analysis will include National Forest planning alternatives above and below the current RPA Program. This array will range from the lowest program level that could be established while continuing to meet environmental, social, economic, and other irreversible commitments through a maximum physical capability level.

43/ Federal Register, Part IV, U.S. Department of Agriculture, Forest Service, Vol. 44, No. 181, September 17, 1979. Rules and Regulations, (36 CFR Part 219).

In addition to these changes the National Forest System was also significantly affected by the Roadless Area Review and Evaluation II (RARE II) process.

The Eastern Wilderness Act of 1975 ^{44/} designated specific National Forest land areas in the East to be included in the National Wilderness Preservation System. It also directed a study of wilderness potential on other specified areas. The Act left open the option of including further National Forest System areas in the National Wilderness Preservation System if found suitable.

As a result of this Act and the evident public interest, a second major effort was initiated in 1977 to reinventory and study the National Forest System roadless areas. RARE II accelerated land and resource management planning of National Forest System roadless areas. As a part of that process, RARE II was designed to consider all the roadless areas of the National Forest System at one time to ensure uniformity of inventory and allocations. The RPA Recommended Program provides long-range guidance for land management planning, including allocation of lands for recommended wilderness designation by Congress. RARE II data for the 62 million acres of roadless undeveloped lands were considered in the development of the 1980 RPA draft Alternative Program Directions. The analyses and evaluation specified resource tradeoffs and identified land areas available for other than wilderness targets.

The process to develop the 1980 RPA draft documents ran concurrently with RARE II. Through RPA, different alternatives for resolving areas identified by RARE II for "further study" were evaluated. The areas identified for "further study" will be further considered for their wilderness potential through regular land and resource management planning.

Changes in the commercial forest land base as a result of RARE II and other land use allocation decision since 1975 are described in table 1.19.

The RARE II decisions ^{45/} for wilderness and nonwilderness were assumed to be final in computing the land base for evaluation of RPA alternatives and determinations of the 1980 Program.

State and Private Forestry Planning

The Cooperative Forestry Assistance Act of 1978 authorizes the Secretary of Agriculture to cooperate with the State Foresters or equivalent State officials to provide assistance on private and non-Federal public lands for:

- the advancement of forest resources management;
- the encouragement of the production of timber;
- the prevention and control of insects and diseases affecting trees and forests;
- the prevention and control of rural fires;

^{44/} 88 Stat. 2096; 16 U.S.C. 1132.

^{45/} The President's recommendations for wilderness, May 2, 1979.

--the efficient utilization of wood and wood residues including the recycling of wood fiber;

--the improvement and maintenance of fish and wildlife habitat; and

--the planning and conduct of urban forestry programs.

The Cooperative Forestry Assistance programs are implemented through State forestry organizations; the Forest Service provides general administration of the programs and technical assistance to the States. The distribution of Federal funds is made to the extent feasible on the basis of State forestry plans and targeted accomplishments. States may choose to receive consolidated Federal payments whereby matching requirements are on a multiprogram basis. This provides for greater management flexibility at the State level.

Commencing in fiscal year 1978, the Forest Service began providing financial assistance to State foresters in forest resource planning. This financial, technical, and training assistance has threefold purpose: (1) to help the States develop or improve their forest resource plans; (2) to help State forestry agencies participate more effectively in cooperative planning efforts with other State and Federal Agencies; and (3) to provide a basis for consolidated payments to the States under provisions of the Cooperative Forestry Assistance Act.

State forest resource planning is compatible with and integral to Forest Service planning. The integration of the Federal and State planning systems provides State input to the RPA Assessment and Program and to the Forest Service annual program budgeting process. The integration of Federal and State planning occurs at the regional level. State and Private Forestry staff in the Regions and Areas work directly with State forestry staff to ensure the needed coordination of information collection, analyses, and presentation. State forestry resource plans are important links for implementation of the RPA Program. The Cooperative Forestry Assistance Act of 1978 encourages the development of such plans as a means of targeting the accomplishments of these cooperative programs.

As a further indication of the emphasis now being focused on private lands, the Renewable Resources Extension Act of 1978 46/ was enacted. It authorizes separate appropriations for the renewable resources extension program in cooperation with State Extension Services, to provide private forest landowners with education and information about managing and using forests, rangeland, fish and wildlife, water, and other renewable resources. It further directs that the Secretary prepare a Renewable Resources Extension Program that takes into account the respective capabilities of private forests and rangelands for yielding renewable resources, and the relative needs for such resources as identified in the RPA Assessment and RCA Appraisal.

Research Planning

The Food and Agriculture Act of 1977, title XIV, National Agricultural Research, Extension, and Teaching Policy Act 47/ places emphasis on

46/ 92 Stat. 349, 16 U.S.C. 1600.

47/ 91 Stat. 913; 7 U.S.C. 1281.

coordinating and planning of agricultural research, extension, and teaching. It also makes clear the intent of Congress to augment, coordinate, and supplement the planning, initiation, and conduct of agricultural research programs existing prior to the enactment of Title XIV. Many coordination requirements are carried out through the Joint Council on Food and Agricultural Sciences and the National Agricultural Research and Extension Users Advisory Board. The RPA process supports the intent and implementation of that law.

The Forest and Rangeland Renewable Resources Research Act of 1978 ^{48/} modernizes and expands the 50-year old forestry research program, providing more specific authority to meet current and future Research needs. This Act provides an appropriate link to other agricultural research national and regional research programs that were published in August 1978. Regional conferences were of major importance in shaping the 1980 RPA Program.

Other Planning

Soil Conservation Service.--Between preparation of the 1975 and 1980 RPA documents, a similar planning process was initiated by the Soil and Water Resources Conservation Act of 1977 (RCA). ^{49/}

The RCA directs the Secretary of Agriculture, through the Soil Conservation Service, to:

(1) develop and periodically update an Appraisal and a Program for the conservation, protection, and enhancement of the Nation's soil, water, and related resources, consistent with the roles and program responsibilities of other Federal, State, and local agencies, and

(2) report to the Congress and the public with respect to the Appraisal, the Program, and the Program's effectiveness.

The first RCA Appraisal and Program is scheduled for completion during mid 1980. Thereafter, the RCA Appraisal and Program and the RPA Program will be updated every 5 years.

The final RPA and RCA Program documents will set forth a comprehensive and coordinated basis for the U.S. Department of Agriculture and its cooperators to take action with respect to the conservation of the Nation's forests and rangelands, soils, water, and related natural resources.

Bureau of Land Management.--The 4-year (1982-1985) appropriation authorization request and report are an integral part of the overall planning efforts of the Bureau of Land Management (BLM). Under authority of the Federal Land Policy and Management Act of 1976 ^{50/} and the National Environmental Policy Act, BLM is upgrading its land use planning to better evaluate competing uses for specific lands. In the President's Environmental Program 1979, direction was

^{48/} 92 Stat. 353; 16 U.S.C. 1600.

^{49/} 83 Stat. 852, as amended; 42 U.S.C. 4321 et seq.

^{50/} 79 Stat. 244, as amended; 42 U.S.C. 1962 et seq.

given the Secretary of Agriculture and the Secretary of Interior to cooperate fully in the preparation of the National Assessment of Renewable Resources called for by the Resources Planning Act, so that the 1979 RPA Assessment would meet the needs for program development of BLM's renewable resources program. Activities are underway to coordinate program planning and implementation to the fullest extent feasible.

Water Resources Council.--River basin studies serve as a vehicle to collect and assemble planning information at the watershed, State, or regional level for incorporation into regional Forest Service land and resource management plans. River basin studies provide basic information for the Assessment and the Program, identify issues, and suggest alternatives for solving problems within the study boundaries, and coordinate the goals of the RPA Program with the goals of other Federal, State, and local planning agencies.

The Water Resources Council (WRC) was founded by the Water Resources Planning Act of 1965 51/ to provide for coordinated planning of the Nation's water and related land resources. The Council has prepared principles and standards for planning that guide all levels of water resource planning. Planning under the WRC guidelines is done at three levels: (1) framework studies that are general appraisals of water-related problems and need for more detailed studies to solve water and related land resource problems; (2) regional or river basin plans that make a preliminary reconnaissance of water level and related land resource plans for a selected area, with 15- to 25-year time horizons; and (3) implementation studies that are program or project feasibility studies for the land resource plans at all levels to provide data and information as inputs to the RPA process. The RPA Program is consistent with approved regional water resource plans. These plans were used in developing the RPA Program of the Forest Service as well as the Assessment.

Heritage Conservation and Recreation Service.--The Land and Water Conservation Fund Act 52/ required each State to have a statewide comprehensive outdoor recreation plan as a basis for financial assistance for acquisition and development of land and water for outdoor recreation purposes. The Heritage Conservation and Recreation Service, U.S. Department of the Interior, is authorized to provide financial assistance from the Fund to States for preparation and maintenance of the State plan. This, in turn, furnishes regional planning information to develop local forestry land and resource management plans.

Process

Considering the current planning situation, including changes in legislation, court decisions, administrative policy decisions and other factors, development of the 1980 Recommended Program involved a process that was comprehensive and complex. A basic description of that process is presented in chapter 2.

51/ 79 Stat. 852, as amended; 42 U.S.C. 4321 et. seq.

52/ 78 Stat. 897, as amended; 16 U.S.C. 4601-4 et seq., 23 U.S.C. 120 (note).

CHAPTER 2:

Program Development Process



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CHAPTER 2: PROGRAM DEVELOPMENT PROCESS

This chapter provides an overview of the process used to develop the 1980 Recommended Program. The overall objective was to formulate a Program that meets legal requirements; is within realistic constraints on numbers of people and total budgets; and is balanced, cost-effective, environmentally sound, and responsive to current and projected needs. A carefully ordered process that drew upon past experience as well as current expertise was required.

The first step was to specify legal requirements. From these and from critiques of the 1975 RPA planning process, a set of planning criteria was developed. Next, the process to identify major policy issues whose resolution would aid in the selection of the Program was initiated.

Five Alternative Program Directions were formulated to provide a realistic spectrum of possibilities for a Forest Service Program, and these were circulated for public comment. Results of this public involvement were analyzed. Methods for comparing alternatives through economic, physical, biological, and social analyses were devised and implemented. Identification, analysis and resolution of policy issues were completed. Finally, criteria for evaluating alternatives were specified and a Program was selected by the Secretary of Agriculture.

Establishing Planning Criteria

Planning for the development of the 1980 Recommended Program began shortly after the 1975 Program was sent to Congress. The first requirement for an improved planning effort was an improved set of planning criteria. These were established by reexamining legal requirements and by considering in-Service and outside reviews of the 1975 Program.

Legal Requirements

The most important and precise legal directions for development of the Program are in section 4 of the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended. These requirements include:

- "...an inventory of specific needs and opportunities for both public and private program investments...."--differentiated among--"...activities which are of a capital nature and those which are of an operational nature;..."
- "...specific identification of Program outputs, results anticipated, and benefits associated with investments in such a manner that the anticipated costs can be directly compared with the total related benefits and direct and indirect returns to the Federal Government;..."

- "...a discussion of priorities for accomplishment of inventoried Program opportunities, with specified costs, outputs, results, and benefits;..."
- "...a detailed study of personnel requirements as needed to implement and monitor existing and ongoing programs..."

The Act also specifies that the Program shall:

- "...evaluate objectives for the major Forest Service programs in order that multiple-use and sustained-yield relationships among and within the renewable resources can be determined;..."
- "...explain the opportunities for owners of forest and rangeland to participate in programs to improve and enhance the condition of the land and the renewable resource products therefrom;..."
- "...recognize the fundamental need to protect and, where appropriate, improve the quality of soil, water, and air resources;..."
- "...state national goals that recognize the interrelationships between and interdependence within the renewable resources; and..."
- "...evaluate the impact of the export and import of raw logs upon domestic timber supplies and prices."

The Resources Planning Act of 1974 provides that the Program transmitted to Congress may include alternatives. In addition, it requires that the Program shall be developed in accordance with the Multiple Use-Sustained Yield Act of 1960 and the principles set forth in the National Environmental Policy Act of 1969 in which alternatives are required for "...major Federal actions significantly affecting the quality of the human environment."

The legal and administrative requirements applicable to Forest Service operations stem from almost 150 laws--far too many to summarize in this document. Details of the legal basis for the Forest Service programs are provided in the 1979 Assessment. Most of the applicable laws are reproduced in The Principal Laws Relating to Forest Service Activities. ^{1/}

These laws obviously have a multitude of provisions. Of these, 10 are particularly important in program formulation. These require the Forest Service to:

- Manage the renewable resources of the National Forest System under multiple-use sustained-yield principles and reduce or eliminate backlogs.
- Coordinate and cooperate with other Federal and State agencies.
- Stress research and development of scientific knowledge as a basis for improved resource management.

^{1/} USDA Forest Service. The principal laws relating to Forest Service activities. Agric., Handb. 453, revised Sept. 1978.

- Provide for basic protection and management of the Nation's forests and rangelands.
- Meet or exceed Federal and State environmental protection requirements.
- Emphasize energy conservation.
- Provide for public involvement in decisionmaking.
- Assure equal opportunities and equal access for all persons.
- Meet public health and safety standards; and
- Provide for protection, facilities, and other needed support.

Review of the 1975 Process

The largest single source of suggestions for improving the RPA process after publication of the 1975 documents was the Forest Service itself--the many people who contributed to the 1975 effort. Suggestions from these people were received through various in-Service channels.

There were also some major sources of suggestions outside the Forest Service, and several reports were particularly constructive. One emerged from the 1976 Inter-University Symposium on Renewable Resources Assessment and Programming held in California in 1976. ^{2/} This report examines the use of the six resource systems, social impact assessments, public involvement, economic issues and methods, aggregation and disaggregation, interagency coordination, ecosystem planning, and analytical systems.

Another report is by the Subcommittee on Forests of the Committee on Agriculture, U.S. House of Representatives. ^{3/} It summarizes the findings of the subcommittee as a result of hearings held in Washington, D.C.; Portland, Oregon; Coeur d'Alene, Idaho; Hot Springs, Arkansas; and Warren, Pennsylvania, during the summer of 1977. More than 150 witnesses testified and more than 30 written statements were received.

The Senate Committee on Agriculture, Nutrition, and Forestry asked the General Accounting Office (GAO) to review the 1975 RPA Assessment and Program documents. ^{4/} The primary recommendation by GAO was that overall issues of

^{2/} Pemberton, Billy G. 1976 inter-university symposium on renewable resources assessment and programming: executive summary. USDA For. Serv. Gen. Tech. Rep. PSW-21, illus. Pac. Southwest For. and Range Exp. Stn., Berkeley, Calif. 21 p. 1977.

^{3/} Subcommittee on Forests of the Committee on Agriculture, U.S. House of Representatives. Implementation of the forest and rangeland renewable resources planning act of 1974. Committee print. U.S. Gov. Print. Off., Wash., D.C. 12 p. Nov. 1977.

^{4/} Report of the General Accounting Office, February 1977. How to improve U.S. Forest Service reports on forest resources. Comptroller General of the U.S. PAD-77-29, p. 6.

concern to the Congress and the general public be discussed in a section separate from resource systems (now called program elements). In the 1975 Program, discussions of such issues were scattered throughout the document.

Planning Criteria

Reexamination of existing laws and evaluation of criticisms and suggestions about the 1975 planning effort led to the following list of planning criteria for development of the 1980 Recommended Program:

Identification and systematic analysis of major policy issues.--The identification, analysis, and resolution of major policy issues provides the basic philosophical planning framework within which the Recommended Program must be formulated. Specification of policy issues early in the planning process also helps assure appropriate responsiveness of the Program to the issues.

Document more clearly the linkage between the Assessment and Program.--A clear understanding of how the Program periodically reevaluates and reestablishes the long-term Forest Service role and of its relationship and responsiveness to specific findings of the Assessment is fundamentally important to RPA document users.

Regionally characterize the Program and Alternatives.--Regional descriptions of the Program and the Alternative Program Directions have important implications for decisionmakers and other users of the Program. This criteria also helps to provide direction and coordination for land use planning in accord with the National Forest Management Act Regulations.

Broaden involvement within the Forest Service.--Broader Servicewide involvement, with emphasis on Forest Service field units, helps to assure that Alternative Program Directions are physically achievable and that estimates of relative benefits, costs, other effects, and tradeoffs are realistic.

Broaden the scope of the Alternative Program Directions.--The Alternative Program Directions that are analyzed and evaluated should include a full range of viable possibilities. This approach provides the necessary perspective for analyses and evaluation of program choices.

Participate and coordinate with other Federal and State agencies.--Coordination with and involvement of other agencies and organizations with related roles helps to assure that the Alternative Program Directions and the Recommended Program are viable. Involvement of State Foresters is especially important in the process. It encourages planning uniformity among States for use in program development and execution now and in future RPA Assessments and Programs.

Link RPA to other Forest Service planning.--The Forest Service is involved with many kinds of planning. To ensure planning efficiency, management continuity, and coordination, these efforts must be closely interrelated with and guided by the Program.

Increase opportunities for meaningful public involvement.--Public involvement in the RPA process will help the Forest Service to develop an acceptable Program that fully reflects public needs. The greater the number of meaningful opportunities, the better the quality of public involvement.

Improve the Program document readability and organization.--To be useful, the 1980 Program must be well organized and clearly written.

Improve tradeoffs and multiresource analyses.--Understanding of Alternative Program Direction tradeoffs and other effects is important in the decision process as well as in demonstrating the rationale for determination of the Program.

Major Changes in the 1980 Process

In response to critiques of the 1975 Program, a number of improvements were made in the development process. Some of the major changes are listed below:

Multiresource approach.--In 1975, analyses centered on individual resources--then called resource systems and now called resource elements. Alternative Program Directions were simply compiled from alternatives developed for each resource system. This did not permit continuous consideration of interactions among uses.

Throughout the development of the 1980 Program, resource elements were viewed together. This holistic approach assured better balance and internal consistency in the Program.

Forest Service regional breakdowns.--The 1975 Program contained only national totals. The ways in which costs, activities, and benefits were to be divided among the Forest Service administrative Regions were not shown. As a result, it was difficult for users to relate the Program to their own situations.

In the 1980 Program, as well as the Alternatives recognized in developing it, Regional totals are displayed. Furthermore, the Program represents different alternatives for different Regions. Thus, it is considerably more responsive to Regional situations than was the 1975 effort.

Resolution of issues.--In 1975, major issues of concern to the public and administration were discussed separately within resource systems. The collection of such issues into a single section in the 1980 effort focused both public and Administration attention on the issues. The result was that appropriate policies were developed to deal with the issues.

Environmental analysis.--In the 1975 effort, the environmental analysis was an entity distinct from other analyses and evaluations. This approach caused some repetition of written discussions. For the 1980 Program, the environmental analysis was a part of an integrated analytical process. In addition, Regional quantitative estimates were made of the environmental effects of each Alternative Program Direction. The social impact assessment was designed, organized, and documented by social scientist consultants.

Resolution Of Policy Issues

Identification

In 1977, an effort was begun to identify issues requiring resolution for the Recommended Program--1980 Update. The primary sources of such issues were the people who will have to implement the Program--managers in the National

Forest System, State and Private Forestry, and Research. Some additional issues originated from the investigations and analyses associated with preparation of the 1979 Assessment. Others were identified in congressional hearing, including the oversight hearings on the 1975 Program and by U.S. Department of Agriculture-level policy officials. Still others came from public comments, from suggestions of other agencies, and from discussions with the Office of Management and Budget.

Selection

By early 1978 a descriptive list of approximately 100 possible policy issues was compiled. These were then carefully discussed, reviewed, and analyzed. It became clear that some had already been resolved or were on the way to resolution. For example, those related to wilderness acreage were being resolved through the second Roadless Area Review and Evaluation (RARE II), which culminated in recommendations to Congress early in 1979. Other issues did not seem appropriate for resolution through the RPA process. Still others in the initial list were consolidated or were reworded. Finally, some proved to be budgetary rather than program issues and more appropriately dealt with in the annual budget and appropriation process.

Department-level policy officials, together with Forest Service officials, approved a final list of 15 issues of major significance. These issues were presented for public review and comment in chapter 4 of the review draft Program circulated for public comment in the spring of 1979. In that draft, alternative action options were stated to emphasize that decisions had not yet been made. The characteristics and importance of each issue were briefly described. Forest Service authority and responsibility for dealing with the issues were outlined, and options for resolution were listed, briefly described, and their likely consequences outlined.

Study

The Forest Service studied each issue in detail. Related literature was reviewed, and specialists from inside and outside the Agency were consulted. The studies were designed to accumulate existing knowledge on each issue so that decisions could be made on the basis of the best available information. Data were accumulated on costs, benefits, environmental effects, and other likely consequences of each of the listed options.

These issue studies were described in individual study papers and in individual option papers which summarize study findings. The latter are considerably briefer and focus on the choices that were available to decisionmakers. Copies of all of these papers are on file in the Forest Service Washington Office.

Public and Other Reviews

Public comments on the draft review Program were received by June 1979. As expected, some additional policy issues were proposed. Each new proposal was reviewed and analyzed carefully and, where appropriate, a supporting study was undertaken.

Additional internal review of all issues resulted in the dropping of two

that had appeared in the review draft Program: multiresource planning and management on nonindustrial private forest and rangelands, and forestry assistance for non-Federal public lands. One major reason for dropping these issues was the recognition that they would be resolved under provisions of the Cooperative Forestry Assistance Act of 1978.

Finally, two new issues were added and two issues were consolidated as a result of further study and evaluation of all proposals. The final list of 14 issues follows:

- production of wood from private nonindustrial forest lands
- increasing softwood products from National Forest System lands
- wood fiber as an energy source
- management of hardwoods
- export and import of raw logs
- pesticide use, research, and registration (consolidated issues)
- user payment for recreational opportunities
- alternative means for financing capital development on National Forest System lands
- recreation development on National Forest System lands
- eastern National Forests
- forage for domestic livestock
- mineral development on National Forest System lands
- expanding wood supplies through improved technology and utilization (new issue)
- Forest Service emphasis on wildlife and fish (new issue)

The results of analysis and evaluation of alternative responses to the issues were reviewed in detail with Department-level policy officials. They provided guidance on the resolution of each issue. Final decisions are consistent with the Multiple Use-Sustained Yield Act of 1960, the Resources Planning Act of 1974 as amended by the Forest Management Act of 1976, and other applicable statutes. The decisions, issue by issue, that provided important guidelines that led to the Recommended Program are summarized in chapter 1.

Formulation Of Alternative Program Directions

In essence, the Recommended Program was determined by formulating and analyzing several realistic alternatives which reflected a wide range of benefits and costs for each resource element. Both the Resources Planning Act of 1974 and the National Environmental Policy Act of 1969 require such an approach, but do not specify the amount of detail. When each resource element is considered separately and all possibilities for each Forest Service Region are listed, a huge array of alternatives is generated. It would be difficult for the public, or even professional resource planners, to digest such an array. Therefore, options were presented in terms of a series of internally consistent and philosophically different national Alternative Program Directions (hereafter called Alternatives) for Forest Service programs and National Forest System management. They were also intended and designed as a framework for the development of data and information about different Forest Service roles that would be representative of the practical ranges of capability and opportunity.

The formulation of Alternatives for the 1980 Program began long before the findings of the 1979 Assessment were available. In the early stages, therefore, development was based on the findings of the 1975 Assessment. Tentative

nations. After analysis and review, five were selected as representative. Detailed information about potential benefits, costs, and consequences of each Alternative were computed. Each was formulated to be physically and legally possible, and all five were issued for public comment.

The resource outputs referred to in the Alternatives are the "products" derived from renewable resources, and are generally thought of in two different categories: those that have a well established market value (forage, timber, water, minerals) and those that do not (recreation, wilderness, wildlife and fish). The former are termed "market resources" and the latter "nonmarket resources." As far as possible, the products are expressed in measurable terms, for example: animal-unit-months, visitor-days of recreation, board feet of timber.

The primary purpose in presenting Alternatives for public review and consideration was to identify the range of options including their estimated costs and effects, from which the Recommended Program would most likely be determined. Because of public involvement and the results of continuing analysis and evaluation of the developed information and other concurrent factors, it was expected that the Recommended Program would be a modification, variation, or combination of one or more of the Alternatives.

Content

Each Alternative represents a different but possible response to the same basic assumptions from the Assessment about the future, about projections of supply and demand for goods and services from forests and rangelands, and about multiresource interactions.

One Alternative describes a significantly increased role for the Forest Service in providing national forestry leadership, outputs from National Forest System lands, and services through research and cooperative forestry programs. Another Alternative describes a significantly diminished Forest Service role. A third is a reevaluation of the 1975 RPA Recommended Program. A fourth describes a completely different role for the Forest Service, with emphasis on providing nonmarket outputs from National Forest System lands and on research and cooperative programs for other lands. The fifth Alternative essentially is a continuation of the existing level and trend of Forest Service activities.

To provide continuity with past RPA planning, the 1975 Program was defined as the moderate output Alternative. It serves as a reference point for changes recommended in the 1980 Program. It also gives more specific meaning to the general terms--high, moderate, and low--used in describing the other Alternative Program Directions.

The Alternatives emphasize different levels and mixes of market and non-market outputs and distinguish National Forest System (NFS) programs from those directed toward State and private lands. Research "outputs" are not quantifiable and are discussed separately.

For each Alternative, goals for each of 12 program elements were developed. These were general statements from which objectives (RPA targets) were developed. Parallel construction of the goals by element in each of the Alternatives permits direct comparison. The term goal as used in the RPA process means a broad general statement, usually not quantifiable and with no specific date for completion.

For each element, differences in the goals of different Alternatives were emphasized. The goals for the Alternatives were distributed for public comment in February 1977 5/ and January 1978. 6/ Subsequent public and internal reviews resulted in a number of changes.

Initial national targets for Alternative 3 (the moderate level and mix) were brought forward from the 1975 Program. Tentative targets for the other four Alternatives were then formulated from their respective goal directions using the upper level of Alternatives considered in 1975 as a constraint. These tentative targets for 1981-1985 and 1995 were distributed to the Forest Service field offices for verification and refinement as needed to ensure development of Alternative targets that were realistically achievable. National targets were finally established by decades through 2025 for over 50 activities and outputs for each Alternative. The term target as used in the RPA process means a quantifiable statement of a planned result to be achieved within a stated time period.

Wilderness targets established for each Alternative are generally consistent with the Roadless Area Review and Evaluation II (RARE II) recommendations for wilderness designations by Congress. They vary principally in how the areas for "further study" might be resolved through land management planning evaluations and further wilderness designation recommendations to Congress.

Each developed Alternative (chapter 3) is consistent with the authorities and responsibilities of the Forest Service and was designed to meet at least the minimum requirements of existing laws and regulations.

Each Alternative was developed using data from Forest Service field offices, State forestry agencies, and university research organizations. Data comparability was achieved through use of common definitions and codes as defined in appendix A and the Forest Service Management Information Handbook (FSH 1309.11). Forest Service field data were derived from existing resource inventories, current management plans, and professional judgement about multiple resource use interactions. Additional information came from other Federal and State agencies and public comments and suggestions.

Using the goals and key output/activity targets as guides, data and information for each major program area were collected.

National Forest System.--Each Region consolidated data for National Forests on outputs, costs, and work force requirements for each Alternative, for fiscal years 1981-1985. In responding to the five Alternatives, the Regional Foresters were guided by the goals for each Alternative contained in the January 1978 Progress Report and by tentative regional targets for selected outputs in 1981 and 1985. Based on Alternative goals and the regional data, the Washington Office projected activities, outputs, costs, and work force needs for the period 1986-2030.

5/ USDA Forest Service. RPA--proposed alternative Forest Service program directions and national goals. 24 p. Feb. 1977.

6/ USDA Forest Service. RPA--the resources planning act--a progress report. 56 p. Jan. 1978.

State and Private Forestry (S&PF).--State agencies supplied data for two program levels--current and high--for fiscal years 1981-1985, and for the decade 1991-2000. For the current level, it was assumed that costs and work force inputs would not change from those in fiscal year 1978, but the mix of activities and outputs could change. For the high level, it was assumed that costs and work force would not be constrained if increases in the Federal share for cooperative forestry programs were matched by increases in the State share. S&PF Area Directors in the East and Regional Foresters in the West worked with the State Foresters to jointly develop Area and Regional S&PF data for each of the five Alternatives. Based on trends indicated by the Assessment and the State data, the Washington Office projected activities, outputs, costs, and work force needs for the periods 1986-1990 and 2001-2030.

Research.--Forest Service Experiment Station Directors estimated activities costs and outputs for each Alternative for fiscal years 1981-1985. Their estimates were guided by the National Program of Research for Forests and Associated Rangelands. 7/ The Washington Office staff projected the activities, outputs, and costs for the period 1986-2030.

Backlog

Section 9 of the Resources Planning Act provides that actions should be taken to assure that by the year 2000 "...renewable resources of the National Forest System shall be in an operating posture whereby all backlogs . . . shall be reduced to a current basis...." Backlogs may be eliminated when (1) the backlog of areas that will benefit are eliminated, (2) the cost of treating the areas exceeds economic and environmental benefits, and (3) the supply of the renewable resource is adequate to meet future needs.

The RPA process has identified only reforestation and land line location as continuing backlog areas.

Public Involvement

One of the key planning criteria for the 1980 RPA process was that the public be given meaningful opportunities to participate in decisionmaking whenever possible. To satisfy this criterion, a comprehensive public participation plan was developed. The specific objectives recognized in that plan were to:

- Increase opportunities for public participation in development of the Assessment and Alternative Program Directions.
- Increase public awareness and support of, as well as involvement in, the RPA process.
- Provide for open two-way exchange for verification of draft materials and development of new information.
- Inform and involve the entire Forest Service in the RPA process.

7/ U.S. Department of Agriculture and Science and Education Administration. National program of research for forests and associated rangelands. Proceedings of a Nat. Work. Conf. ARM-H-1/Aug. 1978.

- Identify public concerns about forests and related resources.

Early Efforts

The first major public involvement effort for the 1980 RPA project was in February 1977. A draft Assessment Element Outline, which previewed the proposed content of the 1979 Assessment, and a draft of the proposed Alternative Program Directions and national goals for the Forest Service were released. The public was asked to judge the adequacy and scope of the Alternative Program Directions that were described, as a basis for updating the RPA Program for 1981-2030. At this stage, a special effort was made to involve State and Federal agencies to assure that the RPA structure was compatible with their policies and programs.

During the 90-day period allotted for comment, suggestions were received from a number of publics, including Federal and State agencies, elected officials, Forest Service personnel, national and local organizations, industry, and unaffiliated citizens. In all, over 2,000 pages of comments were received.

Progress Report

In March 1977, the Forest Service released an information package that was designed to explain the RPA process and to increase public involvement. An eight-page brochure, "Resources Planning Act and You," described RPA, its requirements, and opportunities for public involvement. A slide talk, "Of the People," also explained the RPA process. News releases and magazine articles were prepared and published. The purpose was to keep people inside and outside the Forest Service informed on the continuing RPA process.

The public comments received before the end of 1977 were useful in the further development of the draft Assessment and Alternative Program Directions. The public helped to clarify goals and objectives and to identify needs for additional technical and general information.

To keep the public up to date on progress and use of comments already received, the Forest Service published "The Resources Planning Act: A Progress Report" early in 1978. In addition to describing progress, this publication provided additional information for review and comment. The resulting comments were analyzed and evaluated, and the results were released to show how the comments had been used.

Draft Documents

In March 1979, the Forest Service released the three RPA draft documents, the Report, the Assessment, and Alternative Program Directions. No limitations were placed on areas subject to comment, but the public was specifically asked to closely review and comment about: (1) the projected demand-supply situation, (2) a desirable direction for Forest Service programs, (3) appropriate criteria for determining program direction, and (4) the identified policy issues.

Public briefings on the contents of the draft documents were held in Washington, D.C., and in the nine Regional Offices on March 27. These were followed by public meetings held throughout the country during April, May, and June--the scheduled period for public involvement and comment. Two types of sessions were held: (1) information sessions designed to provide in-depth

briefings and discussions of the draft documents, and (2) involvement sessions designed to assist groups and individuals wanting to submit comments. In addition, local Forest Service officials met on request with any interested groups, individuals, agencies, or officials to explain the draft documents and to answer questions.

When the public comment period closed on June 8, 1979 the Forest Service had received comments from over 1,600 respondents. Since some people indicated that they did not have sufficient time to read the documents and comment fully, the Agency continued to accept comments after the comment period officially closed.

A pilot effort was made to involve urban publics. More than 20 meetings and briefings were held in major urban communities, and about 40 percent of the direct mailings from Forest Service offices went to interested urban publics. Seminars were held in cooperation with the National Council of Negro Women, and workshops on the RPA process were held to reach urban minorities.

Analysis of Comments

About 70 percent of the written responses were from individuals who did not indicate affiliation with any group. The remaining responses were from national and local organizations, Federal and State agencies, elected officials, and industrial and environmental groups.

The comments received were subjected to a comparative input analysis--a procedure designed to emphasize the content of responses rather than the number of people taking a particular position. Such numbers were also tabulated, but the greatest interest was in examining arguments and evidence presented on the complex issues contained in the RPA documents.

An analysis of the comments was performed for each Forest Service Region and for the Nation as a whole. Regional reports were developed from responses originating in respective Regions and from responses outside the Region directing comment solely to that Region. The regional reports were consolidated into a national summary. These materials are reproduced in appendix B.

The comments on the draft RPA documents were used in the decisionmaking required to select a 1980 Recommended Program. Regional Foresters and Experiment Station and State and Private Area Directors were supplied copies of the national summary and the Regional reports on public comment. Responses from the public were a major criterion for selection of appropriate Regional programs which, taken together, constituted the first step toward a Program.

Changes Resulting From Public Comment

The public comments received in connection with the RPA process represent thousands of hours of efforts by private citizens and members of various agencies and organizations. The following list shows examples of the ways in which the process and the final Recommended Program were influenced by public comment:

- As a result of suggestions by many people, including members of Congress, a new Alternative Program Direction was added to the original five for analyses and evaluation.

- Two new policy issues were identified, studied, and resolved as a result of public comment.
- Public responses influenced criteria used to evaluate policy issues and Alternatives.
- A large proportion of the Regional variation in the Program is attributable to the Regional differences in public comment.
- The public found many inconsistencies and errors, which were subsequently corrected.

Analytical Procedures

Detailed analyses were required during two major phases in the development evaluation of Alternatives. They were necessary during Alternative formulation to be certain that each met legal requirements, responded to the Assessment, and represented a balanced and environmentally acceptable Alternative. In each phase, three types of analysis were performed: (1) economic, (2) physical and biological, and (3) social. Each type is briefly described here, along with sources of detailed information. Results of the analyses were interactively considered. An interdisciplinary approach was used in estimating environmental effects throughout the planning, program formulation, and final decision processes.

Most economic effects of the Recommended Program and Alternatives were estimated at selected points in time. The exception is present net worth calculations for National Forest System programs, which reflect the net result for the entire planning period, discounted to the present.

Physical, biological, and social effects were estimated for 1985 as representative of short-term effects and 1995 as representative of long-term effects.

Economic Analyses

Economic effects of National Forest System programs were evaluated by determining the present net worth of future benefits and costs (i.e., the difference between discounted benefits and costs). These effects were determined separately for each of the resource elements. In addition, returns to the government from National Forest System receipts were estimated.

Present net worth was determined by calculating the benefits and costs for all activities that could be quantified into specific units of output. Benefits and costs were discounted at a rate of 7-1/8 percent, the Water Resources Councils' suggested discount rate. To eliminate effects of inflation, all benefits and costs were expressed in constant 1978 dollars. For details on procedures used to calculate present net worths and costs, see appendix C.

Cost estimates were developed by Forest Service Regions and were reviewed in the Washington Office to ensure consistency among Regions. Costs were separated into two major categories: (1) new investments and (2) operation and maintenance. In addition, support costs were charged to the benefiting resource elements for evaluation purposes.

In estimating costs, both the Regions and the Washington Office used the

same approach. A unit cost function for each program element was developed covering the full range of outputs. Costs used were those needed to supply goods and services while meeting the minimum acceptable environmental and multiple-use constraints. It was assumed that cost functions for most outputs would remain fairly stable. However, if production conditions become more difficult or expensive, the basic theory of cost would indicate rising real unit costs.

To achieve consistent valuation of the various goods and services, benefit values for all resources were conceptually based on estimated market values. However, because of the nonmarket nature of dispersed recreation, wilderness, and wildlife outputs, these outputs were valued in terms of what people might reasonably be willing to pay rather than go without. Values estimates for these outputs were based on studies of residual values, use behavior, surveys of users and available transaction data (price information) from the private sector.

For the draft "RPA Alternative Program Directions, 1981-2030", it was assumed that the real values per unit of resource outputs would remain unchanged. This assumption was made because the Water Resources Council and the Office of Management and Budget recommend use of constant values unless there are adequate reasons for projecting real price changes. However, during the review process, the assumption of constant real prices through time was questioned. It was felt this assumption was not consistent with the draft 1979 RPA Assessment finding of increasing natural resource scarcity in some areas.

In response to this concern, two alternatives were examined for adjusting prices to reflect increasing resource scarcity: (1) relative prices for all resource elements would increase at the same constant rate, or (2) relative prices for resource element outputs would change at different rates. The second approach was used because it was more consistent with the Assessment finding of different supply-demand conditions for each resource output. The following tabulation summarizes the changes in the value indexes:

(1978 = 100)

	<u>1985</u>	<u>2005</u>	<u>2025</u>
Timber			
Softwood	131	210	289
Hardwood	100	100	100
Livestock grazing	104	114	118
Minerals			
Energy	114	175	260
Nonfuel	109	140	170
Water	100	100	100
Outdoor recreation			
Developed	100	100	100
Dispersed including wildlife and fish	100	114	140

The State and Private and Research portions of the Program were also economically evaluated. Although present net worths could not be developed, the impacts of State and Private Programs on prices and imports were evaluated using the Timber Assessment Market Model. This model is a spatial market model developed to project long-range trends in price, consumption, and production of timber.

For Research, a historical analysis was conducted of 81 selected innovations. Using procedures described by Battelle 8/, a broad spectrum of Forest Service research programs was examined to demonstrate the kinds and magnitudes of benefits that had occurred from past research programs. It was then assumed that the future program would produce new technology for which the benefits would be at least as beneficial as those from past research.

Physical and Biological Analyses

Physical and biological analyses were designed to determine the effects of an activity upon plant and animal life, air, water, and land. Effects were termed beneficial if they enhanced the quality of human life and adverse if they reduced the quality of human life. Large programs with a variety of objectives frequently have both beneficial and adverse effects. The objective of evaluation often is to estimate the net benefits, but adverse effects are identified, along with opportunities to mitigate them.

All biological and physical analyses for the RPA process were conducted by interdisciplinary teams. Each team consisted of a line officer from the National Forest System, representatives from State and Private Forestry and Research, and other technical staff specialists. A separate team was set up in each Region. Within that Region, the team estimated physical and biological effects in five categories: (1) water quality, (2) air quality, (3) visual quality, (4) cultural resources, and (5) wildlife and fish. The direct and indirect effects of Alternatives on lands in the National Forest System were determined. Where possible, effects were also estimated for other forest and rangelands.

An interdisciplinary team in Washington, D.C. reviewed the findings of the Regional teams and summarized them to formulate national effect estimates.

Details on physical and biological analyses are contained in a report that are on file in the Washington Office of the Forest Service.

Social Analyses

Social analyses estimated the positive and negative effects of Program activities on cultural and institutional values. The purpose was to determine the amount of change that would be caused by the actions associated with a proposed Alternative. Since Forest Service programs are just one of many determinants of the future, it was necessary to envision futures with and without each analyzed Alternative.

The selection of variables to be evaluated for social impact was based on

8/ Battelle Memorial Institute. Interaction of science and technology in the innovative process. Final report. Prepared for the National Science Foundation (Contract: NSF-609) March 1977.

three criteria. First, the variable had to have central significance sociologically. Second, it had to be in either the 1975 Social Assessment conducted by John Kelly (1975) or the Social Assessment Handbook (Gale, 1977). This requirement assured continuity with other social impact research conducted by the Forest Service. Third, the variable had to be significantly related to the primary mission and goals of the Forest Service. The nine social impact variables used were:

- population dynamics
- community economy
- educational quality
- health and environment
- housing quality
- leisure opportunities
- community identity (community context)
- opportunities for minorities
- land tenure and land use

These variables contain measures of cohesion, conflict, cultural values, symbolic meanings, and activities of voluntary organizations. A brief description of the social impact variables follows:

Population dynamics.--: includes population change, community size and density, and population mobility.

Community economy.--: includes employment levels, business indicators, incidence of poverty, transportation opportunities, and effects of Forest Service programs on the tax base and financing of government services.

Educational quality.--: considers educational resources available, the capability to support these facilities, and the characteristics of users of educational facilities.

Health and environment.--: involves the estimated effects of agency programs upon health, safety, air and water quality, and esthetics.

Housing quality.--: considers adequacy of supply, interrelationship between availability and costs, and effects of Agency programs upon housing costs.

Leisure opportunities.--: considers the effects of Forest Service programs upon outdoor recreation opportunities. It includes the type and amount available, accessibility, user types, and impacts on family-oriented activities.

Community identity (community context).--: includes effects upon geographical unity, community or personal identity, historic sites, community institutions such as schools which provide community cohesion, cultural value systems, and voluntary organizations within an area.

Opportunities for minorities.--: considers effects of Agency programs on opportunities for and viability of minority groups within the population.

Land tenure and use.--: includes program impacts on ability of private interests to hold land and care for it, types and amount of public land holdings, and interactions between public land holdings and interests of local residents.

For these nine variables, the basic unit of analysis was the county, community, or area in which people live or carry out daily activities. These units were classed as metropolitan or nonmetropolitan and as highly dependent upon or relatively independent of market and nonmarket Forest Service outputs.

Two other specially designed analyses of social impact were performed, and their results used as indicators of social well-being. The first tabulated future options foregone as a result of particular actions. These effects were estimated by citizen groups in terms of rate and duration of impact. The second estimated the amounts and patterns of probable social conflicts resulting from specific actions.

Effects of program elements on employment, income, and value added were estimated through an input-output analysis. Input-output models were developed for multi-State areas that approximately conform to Forest Service Regions. These models were designed from the 1967 Bureau of Economic Analysis model and then updated to the 1972 economy. Price relationships were increased to 1977 dollars based on the consumer price index. These models are useful only for comparative analyses. A more complete description of the models' structure is on file with the USDA Forest Service, Washington Office. 9/

Social analyses were conducted through the cooperation of sociologists outside the Forest Service. They are described in detail in reports that are on file with the USDA Forest Service, Washington Office. 10/

Analysis of Interactions

Whenever more than one resource is produced on a single piece of land, there is a high probability of a benefit or use interaction. In order to formulate Alternatives that were both efficient and achievable, an analysis was made of interactions and tradeoffs among resource elements. Similar procedures were required to estimate the effects of modifications in Alternatives which took place as the Recommended Program was developed.

A computer model was developed to efficiently allocate production for satisfaction of needs identified in the Assessment. In this model, the Nation's 1.6 billion acres of forest and rangelands were divided into 107 natural communities, and these communities were further divided into resource units. Resource units are distinct land types with approximately equivalent responses to management activities. The model recognizes approximately 5,000 resource units. If a national production level is specified, the model computes the most efficient allocation of effort among resource units to achieve that level. Use of the model in the 1980 RPA process was limited due to its developmental status. It did, however, help confirm conflicts in tentative resource allocations as reported by the Regions. Further details on methods for computing interaction among resources are described in the Assessment.

9/ USDA Forest Service, 1979. The 1980 RPA economic input-output model development, usage, and results. Unpublished report.

10/ Social Well-Being Analysis of Five Alternative Programs by David M. Freeman, August 17, 1979.

Social Impact Analysis of RPA 1980 Recommended Program, Social Analysis Associates, December 6, 1979.

Other interactions were examined among economic, physical-biological, and social factors. No standard method is available for examining such interactions. The approach to this problem was holistic--the results of analyses of these factors were examined as a whole rather than separately. This approach was particularly important (1) in determining opportunities for non-Federal owners to participate in programs for enhancement of renewable resources; (2) in determining the sensitivity of assumptions to change; (3) in resolution of major policy issues; (4) in determining opportunities to meet demands from other public and private sources; and (5) in evaluation of public, other Federal, and State input.

Evaluation Criteria

The draft document "Alternative Program Directions 1981-2030," contained a proposed list of evaluation criteria for use in determining the Recommended Program. Examination of public and other source comments resulted in the development of more specific criteria. Evaluation criteria as described here are intended for use as standards by which Alternatives or their modifications and component parts can be evaluated. They include goals, targets, and constraints of special significance. They are generally grouped in the categories used for analyses--economic, physical-biological, and social.

Economic:

- Identification of National Forest System programs that represent the best economic opportunities in terms of unit costs, present net worth, and returns to the government.
- Responsiveness to inflation as related to productivity and the historically provided share of supply from the National Forest System.
- Improvement of incentives and opportunities for private investments through programs that affect wholesale prices for wood products, and protect forested land from fire, insects, and disease.

Physical-biological:

- Improvement of water quality to meet established water quality goals and treatment of 300,000 acres of National Forest System watershed in degraded condition by the year 2000.
- Provision for water quality protection planning through State and Private Forestry cooperative technical assistance programs.
- Maintenance of State standards for air quality within National Forest boundaries.
- Reductions of wildfire smoke emissions through cooperative assistance programs that increase acres protected from burning on State and private lands.
- Maintenance of visual quality through programs that mitigate their impacts on the natural appearance of forest and rangelands as indicated by acres of change.
- Provision for habitat protection and vegetation diversity to maintain

and increase endangered and threatened species, unique species, and other identified key species as indicated by population trends.

- Identification and protection of cultural resources in advance of environmental-disturbing activities in terms of acres inventoried.
- Maintenance and improvement of resource protection through increased management effectiveness in fire and insect and disease control programs, consistent with other environmental factors in terms of costs per acre.
- Provision for increasing supply of minerals and fiber for energy needs.

Social:

- Maintenance and enhancement of community viability as indicated primarily by income, employment, and population changes.
- Maintenance of opportunities to help the disadvantaged through programs which develop and utilize human resources.
- Dampen increases in housing costs through programs that extend and increase supplies of wood.
- Improvement of health and safety through programs that reduce hazards on forest and rangeland.
- Maintenance of outdoor recreation opportunities through programs that provide for access, activities, and resource protection as indicated by projections of future use.
- Provision for improving ability of landowners to productively manage and maintain private nonindustrial forested lands in a forested condition as indicated by land tenure and use changes.

Research programs were further evaluated in terms of their responsiveness to identified needs 11/, contributions to productivity, and new knowledge.

The evaluation criteria were considered along with other factors to determine the Recommended Program. They were not assigned relative weight or value but were considered interactively and reiteratively. The other factors included evaluation of the unavoidable adverse environmental effects, the relationship between short-term uses of the environment and maintenance and enhancement of long-term productivity, the irreversible or irretrievable commitments of resources, public involvement response, demand-supply outlook, and policy issue decisions.

Finally, the President's environmental, economic, and budget submission

11/ U.S. Department of Agriculture and National Association of State Universities and Land Grant Colleges. National Program of research for forests and associated rangelands. Aug. 1978.

statements and messages provided the Administrative guidelines for the Recommended Program.

Ranging of The Recommended Program

To provide flexibility, the Program has been constructed to provide a range of resource options. After 1981, it provides detailed information on the High and Low Bounds of this range. This Program range will permit adjustments to reflect emerging resource opportunities and needs, budget constraints, and other pressing national priorities.

Budget proposals for the Forest Service will fall within the Bounds of the Recommended Program range. For 1981, the Recommended Program is identical to the President's 1981 budget proposal.

The entire Program range reflects thorough economic analyses, careful consideration of environmental factors, and consistent responses to policy decisions. It is also consistent with NEPA requirements, and the draft Alternatives that the public reviewed and commented upon.

Final Decision Process Summary

The Recommended Program represents a multitude of decisions involving large numbers of Forest Service and other U.S. Department of Agriculture personnel and policy-level officials working closely together.

The final decision process started after the analyses of public comments was completed. When results of this and other analyses were available, regional programs were formulated for the National Forest System, and State and Private Forestry by the Regional Foresters and Area Directors. At the same time, a tentative national program for Research was also developed.

These proposals, which reflected local needs and capabilities along with the proposed National Research Program, established the starting point for development of the 1980 Program. The proposals were analyzed, element by element. For State and Private Forestry and Research Programs, the lowest level (Alternative 2) was selected as the zero base or starting point. For the National Forest System, a combination of low-level (Alternative 2) elements and other program elements which provided a positive present net worth, discounted initially at 4 percent and later at 7 1/8 percent, was the starting point. Increments were then added for irreversible commitments and major policy decisions. Further analyses and refinement of increments improved overall program efficiency and responsiveness to other evaluation criteria.

These increments and associated information were then presented to appropriate Department of Agriculture policy officials and the Chief of the Forest Service for final decision. This incremental evaluation for both the High and Low Bound of the Recommended Program is described in chapter 5.

Fundamental to the decision process was the data upon which the decision-makers relied. Chapter 3 describes the Alternatives, which provided the bases for formulating increments in the 1980 Program.

CHAPTER 3:

Alternative Programs



Chapter 3 - Alternative Programs

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CHAPTER 3

INTRODUCTION TO THE ALTERNATIVES

PART A of this chapter describes each of the five Alternative Program Directions which were presented in the March 1979 review draft, "Alternative Program Directions, 1981-2030." Some changes have been made to these original Alternative Programs to reflect more recent information, correction of errors, and changes in analysis procedures such as in the economic effects of each Alternative. Changes were also made as a result of public comments. None of the changes, however, affected the original intent of the Alternatives, or their relationship to each other.

The Alternatives encompass different levels and mixes of market and non-market outputs, and different relative roles between National Forest System (NFS) programs and Forest Service programs for the State and Private Forestry (S&PF) sectors.

PART B describes some of the additional alternatives which were considered as a result of public comments on the review draft. Alternative 4a is displayed in detail as an example of the type of analytical information that could be, and in several cases was, developed for the additional alternatives.

The index on the next page is designed to assist in finding specific sections within this chapter. It lists the pages on which subjects common to each Alternative are presented.

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PART A

Description of Original Five Alternative Program Directions

Alternative 1

Forest Service programs would provide a high level of market and nonmarket outputs on National Forest System, and State and private forest and range lands. Research would focus on support of high market and nonmarket outputs while protecting basic resources and minimizing conflicting uses on both public and private forest and rangelands. Human Resource Development Programs would be minimized.

Alternative 2

Forest Service programs would provide a low level of market and nonmarket outputs on National Forest System, and State and private forest and range lands. Research would generally be limited to support of stewardship of all resources on both public and private forest and rangelands. Use of human resource programs workforces would be directed toward the protection and maintenance of National Forest System lands.

Alternative 3

Forest Service programs would provide a moderate level of market and nonmarket outputs on National Forest System, and State and private forest and rangelands. Research would focus on technological support necessary to intensify the management of resources on both public and private forest and rangelands as described in Regional and national programs for research. Human resource programs would slightly increase.

Alternative 4

Forest Service programs would provide a low level of market and a high level of nonmarket outputs on National Forest lands, and a high level of market and nonmarket outputs on State and private forest and rangelands. Research would focus on support for a shift in market outputs from public to private forest lands while protecting basic resources and minimizing conflicting uses on both public and private forest and rangelands. Emphasis of the human resource programs would be directed toward promoting better understanding of the natural environment, through employment and training.

Alternative 5

Forest Service programs would provide for a moderate level of market and a low level of nonmarket outputs on National Forest lands, and a low level of market and nonmarket outputs on State and private forest and rangelands. Research would continue needed support for the current level and mix of resource management activities on both public and private forest and range lands. Human resource programs would continue at current levels.

To obtain a better understanding of the development of these Alternative Program Directions, and of the differences among them, the reader may wish to review the Alternatives in the following sequence:

Alternative 5, which is a projection of the current Forest Service roles and program mix.

Alternative 3, which is a reevaluation of the 1975 RPA Program, with adjustments to reflect changes since 1975.

Alternative 4, which represents a major shift in Forest Service roles and program mix. National Forest Service activities would emphasize nonmarket outputs, while State and Private Forestry activities would support greatly increased market and nonmarket outputs.

Alternative 1, which represents, for the National Forest System, the highest program under current laws and land capabilities. State and Private Forestry activities would also support increased market and nonmarket outputs.

Alternative 2, which is the lowest program level and activity mix that can still meet major program responsibilities under current laws.

Organization of the Alternatives

This chapter presents the Alternatives, including several key activities and outputs attributable to the National Forest System (NFS), State and Private Forestry (S&PF), and Research. Some of these activities and outputs are displayed on a Regional and area basis. To aid in understanding the data, and to avoid repetition as each Alternative is discussed, the following organizational description is offered.

Each Alternative Program Direction presented in the following pages contains a brief description of the Alternative, followed by a program summary. Following the summary narratives and tables for each Alternative is a body of detailed information. This material explains Forest Service programs for the Alternative in terms of goals, outputs, and activities for each of the 12 program elements and by major Forest Service program areas; i.e., National Forest System, State and Private Forestry, and Research.

Selected outputs and activities for the 12 program elements are displayed in graphic and tabular form to illustrate Regional emphasis on the various programs.

Backlog work is discussed where applicable and included in the totals for outputs and activities.

The description of each element is followed by a brief resume of the environmental effects of the Alternative. More details on the physical-biological and social effects are presented in chapter 4 where the effects are arrayed by Alternative and by Region. Further information on the social effects of the Alternatives is found in separate social analysis reports (on file with the USDA Forest Service, Washington Office:

Social Impact Analysis Report On RPA 1980.

A Social Well-Being Analysis of Five Proposed Alternative Program Directions.

Economic effects on the National Forest System are presented in narrative and tabular form. Significant modifications from the procedures used in the draft Alternative Program Directions sent out for public review include: 1) Allocation of joint and separable costs of the four Support elements to the eight Resource elements. 2) Use of a 7-1/8 percent discount rate. 3) An adjustment for rising real values of resource outputs. 4) Exclusion of the human and community development element from the display in the direct economic analysis because these benefits are social in purpose. Chapter 2 and the appendix contain detailed overviews of the economic analysis procedures.

ALTERNATIVE PROGRAM DIRECTION 1

(Forest Service programs would provide for high-level market and non-market outputs on National Forests and on State and private forest and rangelands.)

Alternatives 1 recognizes the high potential of the Nation's forest and rangeland resources to provide goods and services for national needs and enjoyment, and also to meet the needs of future generations. Accordingly, it was developed to employ Federal support for developing the resources, to reduce the relative price increases for forest products, and to improve environmental quality.

Program in Brief

National Forests

To make optimum use of the land and its resources and to assure a continuous flow of all goods and services, the land would be managed under multiple use-sustained yield principles. Certain lands would be managed in accordance with law for special or restricted uses to enhance the quality of those specific uses, and to minimize conflicts. In order to coordinate uses and minimize potential adverse impacts on the land, the relative values of the different resources were evaluated in determining land and resource use patterns to meet the needs of the Nation.

State and Private Forestry

State and Private Forestry programs would emphasize market and nonmarket objectives. Outputs attributable to Federal assistance would be higher than those projected in the 1975 Recommended Program, but not as high as under Alternative 4. Increased financial and technical assistance through State forestry agencies would support increased outputs and minimize negative physical-biological effects in accordance with landowner objectives.

Research

Forestry research would be directed toward intensifying management to protect resources under high-use levels, expanding opportunities for managing complementary uses of forest and rangelands, and developing the means to minimize conflicts between otherwise competing uses. Research efforts in all areas would be intensified.

Human Resource Development

The need for separate Human Resource Development Programs would be minimized under this Alternative. Job opportunities and employment would be high from having high-level production in forest and forest product industries. There would continue to be the need for a low-level program to maintain employment and training program capability.

Summary of Program Outputs, Activities, and Costs

Alternative 1 would furnish the highest level of recreational opportunities on the National Forest System. Developed recreation use would increase from 80 million visitor days in 1978 to 190 million in 2025, and dispersed recreation use during the same period would increase from 130 million to 253 million visitor days, excluding wilderness use. Cooperative assistance would increase to promote optimum capabilities for dispersed recreation on State and private lands.

About 25 million additional acres would be recommended for wilderness designation in the National Forest System, including nearly 7.5 million acres in Alaska. They would be areas which contain a wide range of wilderness values. Wilderness management would increase substantially.

On the National Forest System, wildlife improvements would increase from 2.3 million acre equivalents in 1978 to 3.8 million in 1985. Anadromous fish habitat improvements would increase the annual contribution of the National Forests to the commercial salmon fishery by 3.8 million pounds in 1985 and 25.5 million pounds in 2005. Cooperative assistance for wildlife and fish habitat improvements on non-Federal forest lands would increase significantly.

Livestock grazing on the National Forest System would increase from the present 9.9 million animal-unit-months to 15.5 million in 2025. Cooperative assistance for forage production on non-Federal forested range would increase considerably.

National Grassland management would make maximum use of the Federal land to demonstrate sound and practical principles of land use, and to exert a favorable influence for securing sound land conservation practices on associated private lands to help assure a continuous flow of goods and services from both Federal and private lands.

The National Forest System timber supply would expand significantly and rapidly to meet projected increases in demand. Annual timber sale offerings would expand from 12.2 billion board feet in 1978 to 17.9 billion in 2025. Reforestation would increase to 449,000 acres in 1988, and to 532,000 in 2025. Emphasizing National Forest System timber production could reduce the short-term economic incentives for increasing production on State and private forest lands. However, cooperative assistance would be expanded to provide these incentives.

Alternative 1 would increase water quantity and would meet water quality goals. Cooperative assistance to protect and improve the quality, quantity, and timing of water yields on non-Federal forest lands would increase significantly.

Maximum efforts would be made to process the predictable increase in mineral proposals on the National Forest System, reaching an estimated 18,900 cases in 1981 and 40,300 by 2030. Lands where other resource values have been adversely impacted would be reclaimed as soon as possible. Strong emphasis would be placed on cooperative assistance to State forestry agencies for mined area reclamation.

Research would emphasize production of knowledge and technology by action programs to manage both commercial and noncommercial resources at high levels. Basic resource protection would be stressed, as well as knowledge and technology needed to minimize conflicts between alternative uses of both public and private forest and rangelands.

Alternative 1 would reduce the level of human resource employment and training programs in the Forest Service, and would stress grants to State and local governments. Cooperative assistance to States and cities for urban and community forestry would increase significantly.

The total Forest Service work force, in thousand person-years, necessary to perform the work included in this Alternative program is as follows:

Base year						1986-	1991-	2001-	2011-	2021-
1978	1981	1982	1983	1984	1985	1990	2000	2010	2020	2030
44.4	77.8	80.6	85.5	87.7	89.4	87.3	87.7	89.4	93.2	97.1

Table 3.1 displays a national summary of National Forest System projected program outputs, activities, costs, and returns to the government for Alternative 1. Table 3.2 shows comparable data for State and Private Forestry. Table 3.3 summarizes the Research program. Program costs by program area for Alternative 1 are shown in figure 3.1.

**Table 3.1--Projected National Forest System program outputs, activities
and costs 1/**

Alternative 1

Program element and output/activity	Unit of measure	Base year 1978	Annual units									
			1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
RECREATION												
Developed Recreation Use (Includes VIS)	Million Recreation Visitor Days	79.6	90.8	95.3	101.2	107.4	110.6	121.7	140.2	154.1	170.7	190.0
Dispersed Recreation Use (Includes Wild- life & Fish)	Million Recreation Visitor Days	130.2	141.3	147.3	154.2	161.4	167.6	178.3	192.2	213.5	234.4	252.6
Trail Construction/ Reconstruction	Miles	600	3500	2400	2400	2400	2400	2600	2900	3000	3200	3300
WILDERNESS												
Wilderness Management	Million Acres	15.3	35.2	36.4	37.5	38.4	39.3	40.6	40.8	41.0	41.1	41.3
WILDLIFE & FISH												
Wildlife Habitat Improvement	Thousand Acre- Equivalents	2330	3250	3160	3270	3490	3750	3120	2980	2320	1530	1560
Anadromous Fish Improvement	Thousand Pounds	--	3	210	581	1680	3750	9680	19600	25500	25500	25500
RANGE												
Grazing Use (Live- stock)	Million Animal- Unit Months	9.9	10.2	10.2	10.3	10.5	10.6	10.9	12.0	12.9	14.0	15.5
TIMBER												
Programmed Sales Offered	Billion Board Feet	12.2	12.3	12.4	12.5	12.6	12.9	13.3	14.4	15.9	17.1	17.9
Reforestation	Thousand Acres	411	463	518	532	548	545	449	469	490	513	532
Timber Stand Improvement	Thousand Acres	420	500	491	491	492	497	484	488	509	537	570
WATER												
Volume Meeting Water Quality Goals	Million Acre Feet	--	403	404	405	407	408	412	418	421	421	421
MINERALS												
Minerals Leases and Permits	Thousand Operating Plans	14.5	18.9	20.5	22.3	23.9	25.4	27.9	32.2	36.5	39.7	40.3
HUMAN & COMMUNITY DEVELOPMENT												
Human Resources Programs 2/	Thousand Enrollee Years	14.8	16.7	9.0	9.0	9.0	9.0	5.1	5.1	5.1	5.1	5.1
PROTECTION												
Fire Management Effectiveness Index	Dollars/ Thousand Acres	1110	1100	1170	1160	1210	1240	1220	1200	1190	1180	1150
Fuelbreaks & Fuel Treatment	Thousand Acres	392	302	386	433	452	456	455	445	445	445	445
LANDS												
Land Purchase and Acquisition (Excludes Exchange)	Thousand Acres	117	238	223	223	225	226	397	110	145	180	204
SOILS												
Soil & Water Resource Improvement (Improved Watershed Condition)	Thousand Acres		30.9	32.2	35.2	39.5	43.0	44.7	42.5	38.5	39.8	41.2
FACILITIES												
Road Construction/ Reconstruction (Arterial, Collector)	Miles	690	480	850	1050	1120	1200	1850	2250	690	680	680
RETURNS TO THE GOVERNMENT												
	Million Dollars		1116	1114	1198	1276	1368	1558	1826	2352	3038	4446
COSTS												
NATIONAL FOREST SYSTEM-												
Operational	Million Dollars	676 3/	878	1014	1048	1090	1110	1241	1312	1355	1428	1486
Capital Investments 4/	Million Dollars	684	1100	1039	1270	1203	1255	1126	1300	1307	1339	1384
Backlog 5/	Million Dollars	61	55	60	65	67	54	33	29	--	--	--
Total Appropriated 6/	Million Dollars	1421	2033	2113	2383	2360	2419	2400	2641	2662	2767	2870
Allocated Funds 7/	Million Dollars	244	353	355	256	357	358	271	6	6	6	6
Total NFS	Million Dollars	1665	2386	2468	2639	2717	2777	2671	2647	2668	2773	2876

1/ All costs and returns are shown in constant 1978 dollars.

2/ Human Resource Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

3/ The 1978 base year figure has been adjusted upward in order to include the effect of the revised fire financing policy which calls for full funding of presuppression activities instead of relying on supplemental appropriations. The amount of the adjustment (92.4) is from the 1979 President's Budget.

4/ NFS capital investments are such things as: sale preparation--live volume; TSI/reforestation; range structural improvements; road and trail construction/reconstruction; wildlife and fish habitat improvement; developed recreation site construction; water and soil resource improvements; and fuel treatments.

5/ Backlog costs are shown here for information only and are included in capital investment costs.

6/ Total appropriated costs are the sum of operational and capital investment costs. NFS appropriated funds include all YCC and Cooperator Funds.

7/ NFS allocated costs include YACC and other human resource programs, O&C Grants, Land and Water Conservation, and other funds. Costs exclude payments to States and Counties, and Federal Highway Funds.

Abbreviations used: AUM = animal unit month; RVD = recreation visitor day.

Table 3.2--Projected State & Private Forestry program outputs, activities and costs 1/

Alternative 1

Program element and output/activity	Unit of measure	Base year 1978	Annual units									
			1981	1982	1983	1984	1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
RECREATION												
Technical Assistance for Dispersed Recreation	Thousand Acres	81	288	300	328	353	372	417	528	556	577	604
WILDLIFE & FISH												
Technical Assistance for Wildlife Habitat Improvement	Thousand Acres	170	839	914	990	1070	1120	1230	1510	1560	1610	1630
RANGE												
Technical Assistance for Range Improvement	Thousand Acres	50	158	175	206	227	224	264	320	341	376	396
TIMBER												
Reforestation (RFA, FIP, ACP)	Thousand Acres	326	748	814	884	945	1020	1060	1140	1230	1320	1390
Timber Stand Improvement (RFA, FIP, ACP)	Thousand Acres	275	627	647	678	702	731	784	930	1030	1120	1200
Timber Prepared for Harvest	Million Cubic Feet (MMCF)	225	298	318	327	340	347	381	425	451	478	499
Woodland Owners Assisted	Thousand Owners	165	258	271	301	310	315	318	409	388	411	432
Improved Wood Utilization	Million Cubic Feet (MMCF)	164	223	227	233	237	242	255	280	292	304	315
HUMAN AND COMMUNITY DEVELOPMENT												
Urban and Community Forestry	Thousand Urban Areas	7.0	3.2	4.0	4.7	5.0	5.4	6.2	8.1	8.9	8.6	8.6
PROTECTION												
Insect and Disease Surveys	Million Acres	600	528	580	635	685	726	754	751	774	777	779
Rural Community Fire Protection	Thousand Approved Applications	3.0	4.0	4.5	4.6	4.8	4.9	5.0	5.0	5.1	5.2	5.3
Fire Loss on Protected Area	Thousand Acres Burned	1700 2/	1620	1590	1550	1530	1470	1480	1430	1330	1240	1160
WATER, MINERALS, LANDS AND SOILS												
State Forest Resource Planning	Million Acres	--	213	163	211	181	193	207	257	218	220	213
Landowner Forest Management Plans	Million Acres	3.2	4.1	4.3	4.4	4.6	4.7	4.9	5.3	7.9	9.7	11.4
Cooperative Technical Assistance	Person Years	--	89	93	96	109	111	110	114	135	126	121
COSTS												
STATE AND PRIVATE FORESTRY-												
Operational	Million Dollars	30	51	62	62	62	62	72	81	91	94	96
Capital Investments 3/	Million Dollars	50	88	120	120	120	120	121	130	136	136	139
Total Appropriated 4/	Million Dollars	80	139	182	182	182	182	193	211	227	230	235
Allocated 5/	Million Dollars	37	75	83	83	83	83	74	81	84	90	96
Total S&PF	Million Dollars	117	214	265	265	265	265	267	292	311	320	331

1/ All costs are shown in constant 1978 dollars.

2/ S&PF-Cooperative Fire Loss base figure is calendar year 1977.

3/ S&PF capital investments include such activities as: reforestation; timber stand improvement; preparation of landowner forest management plans; cooperative forest resource planning; insect and disease surveys; and fire management planning and fuel treatment.

4/ Projected estimates of funds appropriated to the Forest Service for cooperative forestry assistance under P.L. 95-313.

5/ Projected estimates of funds appropriated to other USDA agencies for programs which receive assistance from the Forest Service and State forestry agencies, including (1) forestry practices under the Agriculture Conservation Program and the Forestry Incentives Program funded through the Agricultural Stabilization and Conservation Service; (2) Rural community fire protection funded through the Farmers Home Administration; and (3) funds allocated to the Forest Service by the Soil Conservation Service for the forestry aspects of watershed planning, flood prevention, river basin surveys and investigations, and resource conservation and development.

Table 3.3.--Planned Research program activities and costs

Alternative 1

FOREST RECREATION RESEARCH	Maximum capability to assess and predict recreation supply and demand and protect recreation resources.
WILDERNESS RESEARCH	Greater knowledge to manage and protect wilderness and unique ecological features.
WILDLIFE, FISH, AND PLANT HABITAT RESEARCH	More scientific knowledge of all game and non-game species; vertebrates and invertebrates and their habitats.
RANGE RESEARCH	Expanded base of knowledge to increase livestock production and forage from forest and rangelands using methods that are energy efficient and environmentally acceptable.
TIMBER MANAGEMENT RESEARCH	Increased knowledge on multiresource timber culture to achieve fullest site potential.
FOREST PRODUCTS UTILIZATION RESEARCH	Increased knowledge for energy needs, biomass, and lowgrade hardwood utilization from public and for improved structural designs.
FOREST ENGINEERING RESEARCH	Increased knowledge to improve harvesting productivity, reduce pollution, and increase harvest of biomass, hardwoods, and residues.
WATER RESOURCE RESEARCH	Substantially increased knowledge to provide water quality and quantity on and off site, reduce pollution and improve water resource features.
SURFACE ENVIRONMENT AND MINING (SEAM) RESEARCH	Increased knowledge to improve mine area streamflow quality, recreation, wildlife habitat, range and timber production, and maintain undisturbed nearby ecosystems.
URBAN AND COMMUNITY FORESTRY RESEARCH	Significantly increased knowledge to assess urban forest benefits, understand urban forest processes, protect and integrate into total urban planning and management process.
FIRE AND ATMOSPHERIC SCIENCES RESEARCH	Significantly increased knowledge of improved fire management systems, fire effects and air quality.
FOREST INSECT AND DISEASE RESEARCH	Significant increase in number of impact assessment techniques and insect and disease management systems.
RENEWABLE RESOURCES ECONOMIC RESEARCH	Significantly increased development of knowledge to provide economic analyses of alternative multiresource management systems.
RENEWABLE RESOURCES EVALUATION RESEARCH	Up-to-date inventories and analyses of all renewable resources on all forest and range lands.
SOIL MANAGEMENT RESEARCH	Substantial increase in development of knowledge of soil management for intensive multiresource use, and to maintain other valuable natural features.

	1970	BASE YEAR 1978	AVERAGE ANNUAL COSTS									
			1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
COSTS												
RESEARCH-												
Operational ^{1/}		105.8	3/175.9	186.9	197.8	208.8	219.8	254.6	287.4	317.3	345.0	369.2
Capital Investments ^{2/}		2.7	34.6	28.0	21.4	14.8	8.2	6.2	2.5	3.9	4.2	8.1
Total Research	76.4	108.5	210.5	214.9	219.3	223.6	228.0	260.8	289.9	321.2	349.2	377.3

^{1/} Research program costs only. YCC, YACC, and other Human Resource Programs are included with NFS.

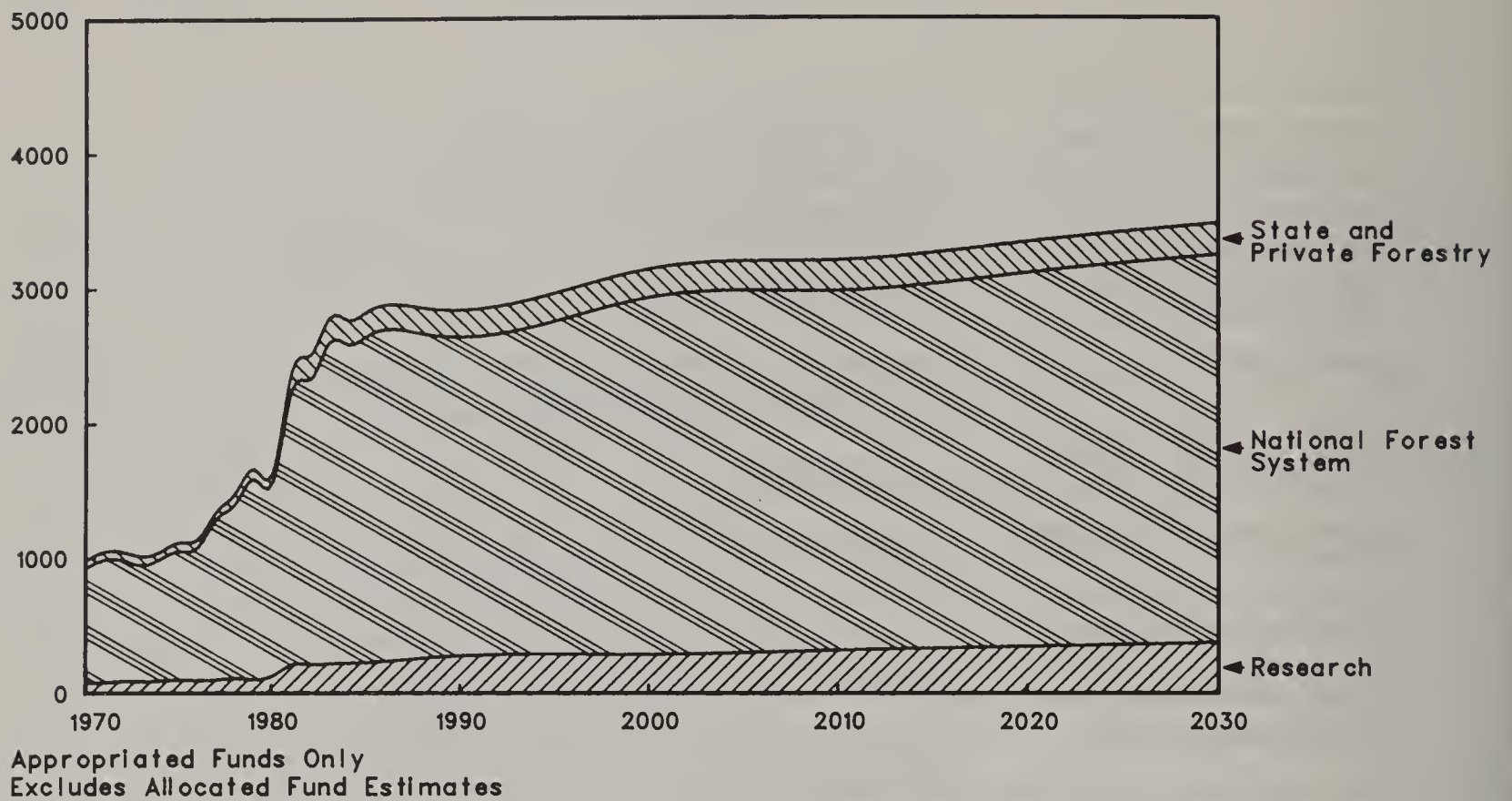
^{2/} Research construction.

^{3/} All costs are in 1978 dollars.

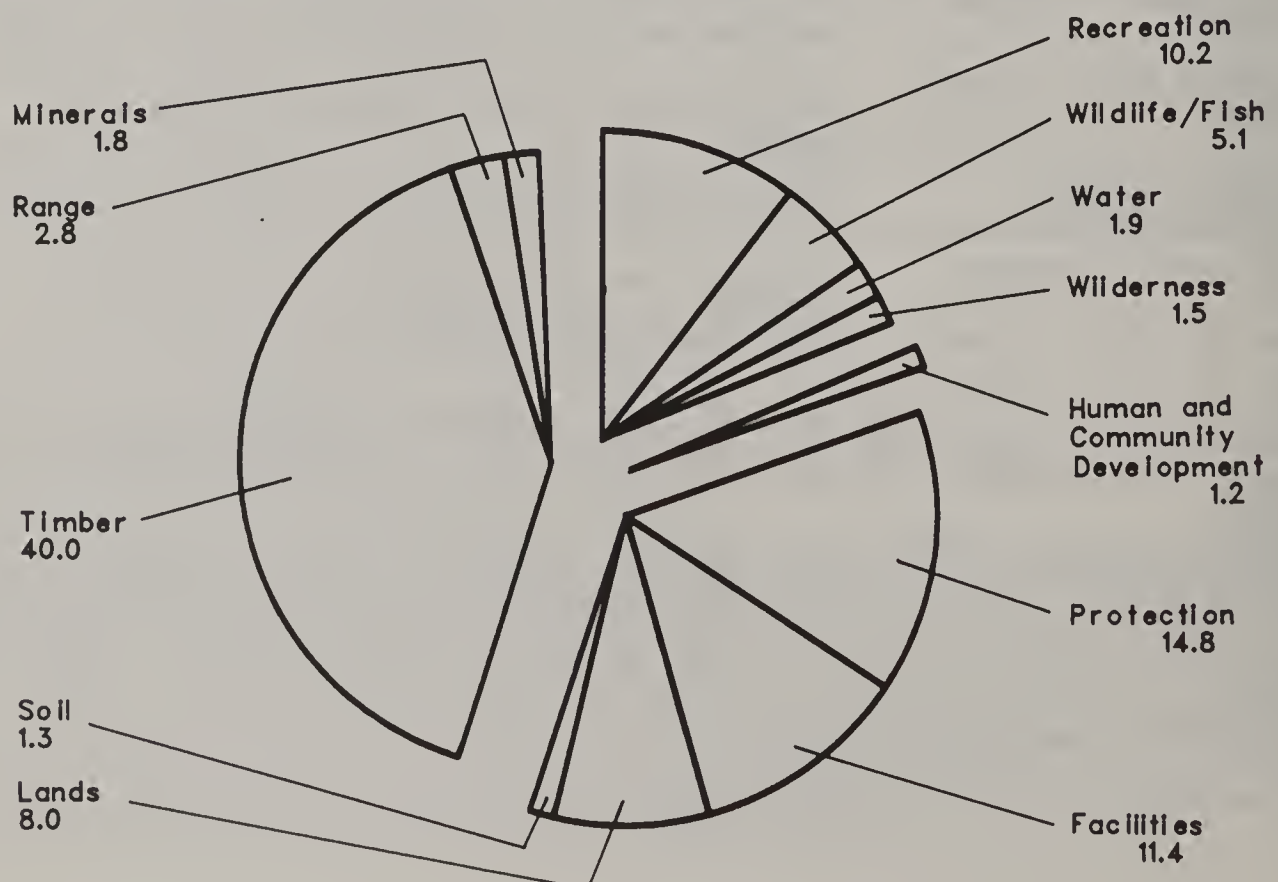
Figure 3.1

Program Cost-Alternative 1

Million Dollars



Alternative 1 Percent of Total Cost by Element 1991 - 2000



THE DETAILS

This section contains additional narrative and graphic material on goals, outputs and activities for each element in Alternative 1. The last part of the section summarizes environmental effects of the Alternative.

Recreation

National Goals

General, NFS.--Provide for a significantly increased relative national share of use and outdoor recreation opportunities.

Developed sites, NFS.--Significantly increase development and maintenance of concentrated use sites where need and demand exist, with emphasis on accessibility to urban areas.

Dispersed recreation use, NFS.--Provide for significantly increased dispersed outdoor recreation use.

Private investment, NFS.--Encourage private investments of risk capital in outdoor recreation facilities on NFS and other lands.

Visitor Interpretive Service (VIS), visual and cultural resource management, NFS.--Provide orientation and interpretive services to majority of visitors within the NFS and at Forest Service facilities. Analyze, manage, and promote visual and cultural resource values.

Cooperation with others, S&PF.--Promote cooperative planning and provide technical assistance for outdoor recreation on other public and private lands. Private owners desiring technical assistance for income-producing projects would be referred to the Soil Conservation Service or to consultants.

Forest recreation research.--Increase efforts to augment development and use of scientific knowledge to assess and predict recreation demand and supply, improve methods for planning, protecting, and managing recreation and visual resources, improve methods for managing visitor use, and improve technology transfer.

Outputs and Activities

National Forest System.--Alternative 1 would make available the highest level of recreational opportunities on National Forest lands. As depicted in figures 3.2 and 3.3, the amount of increase would be similar in all Regions. Developed site use would increase from 80 million visitor days in 1978 to 190 million visitor days in 2025. Dispersed use (excluding wilderness) would increase from 130.2 million visitors days in 1978 to 253 million visitor days in 2025. Cultural resources would receive significant increases in interpretation, enhancement and protection. Highlights of this Alternative are:

- Maintain the current balance between dispersed and developed site recreational opportunities.

Figure 3.2

Regional Estimates-Alternative 1 Developed Recreation Use (NFS)

Million Recreation Visitor Days

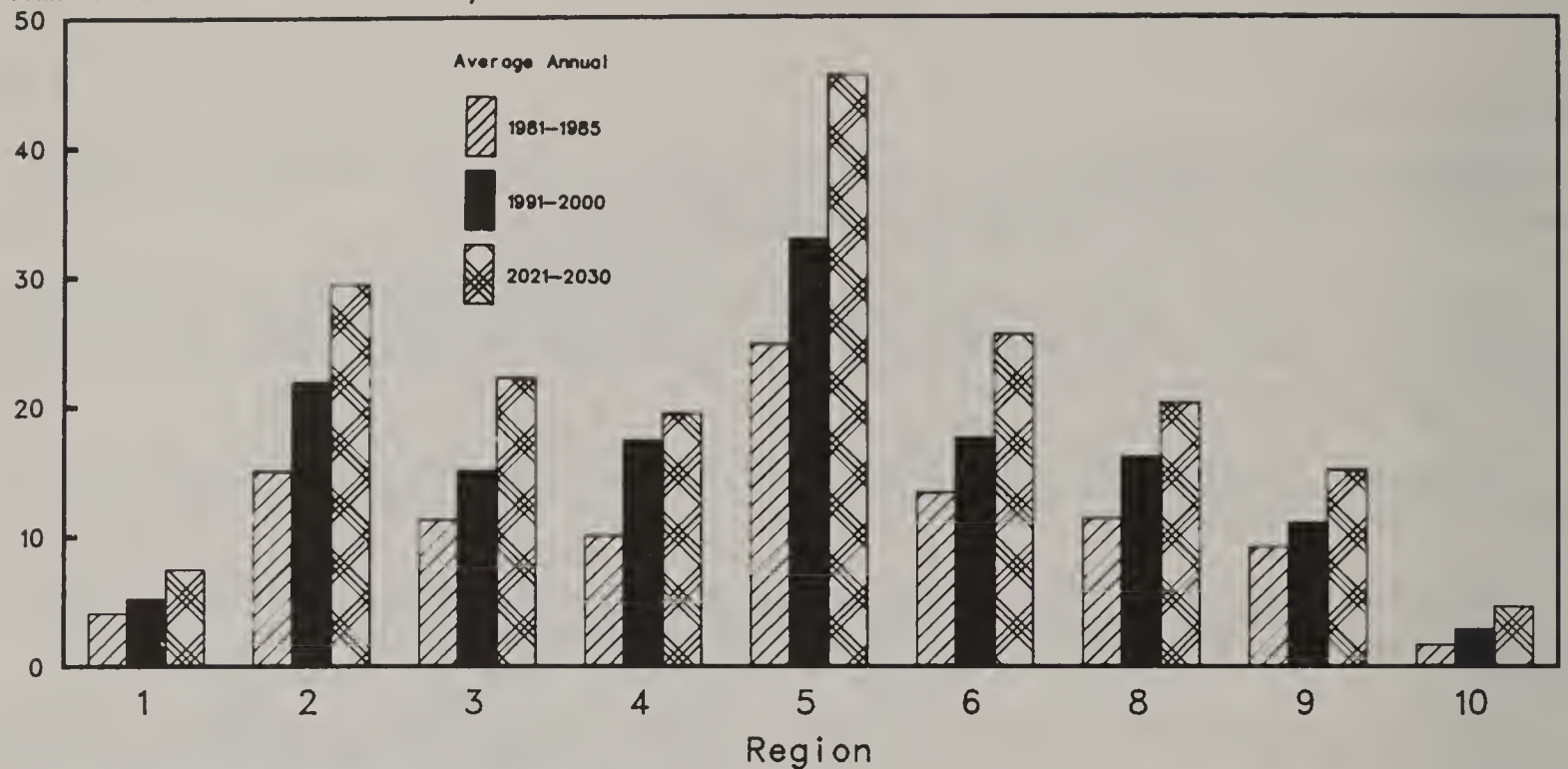
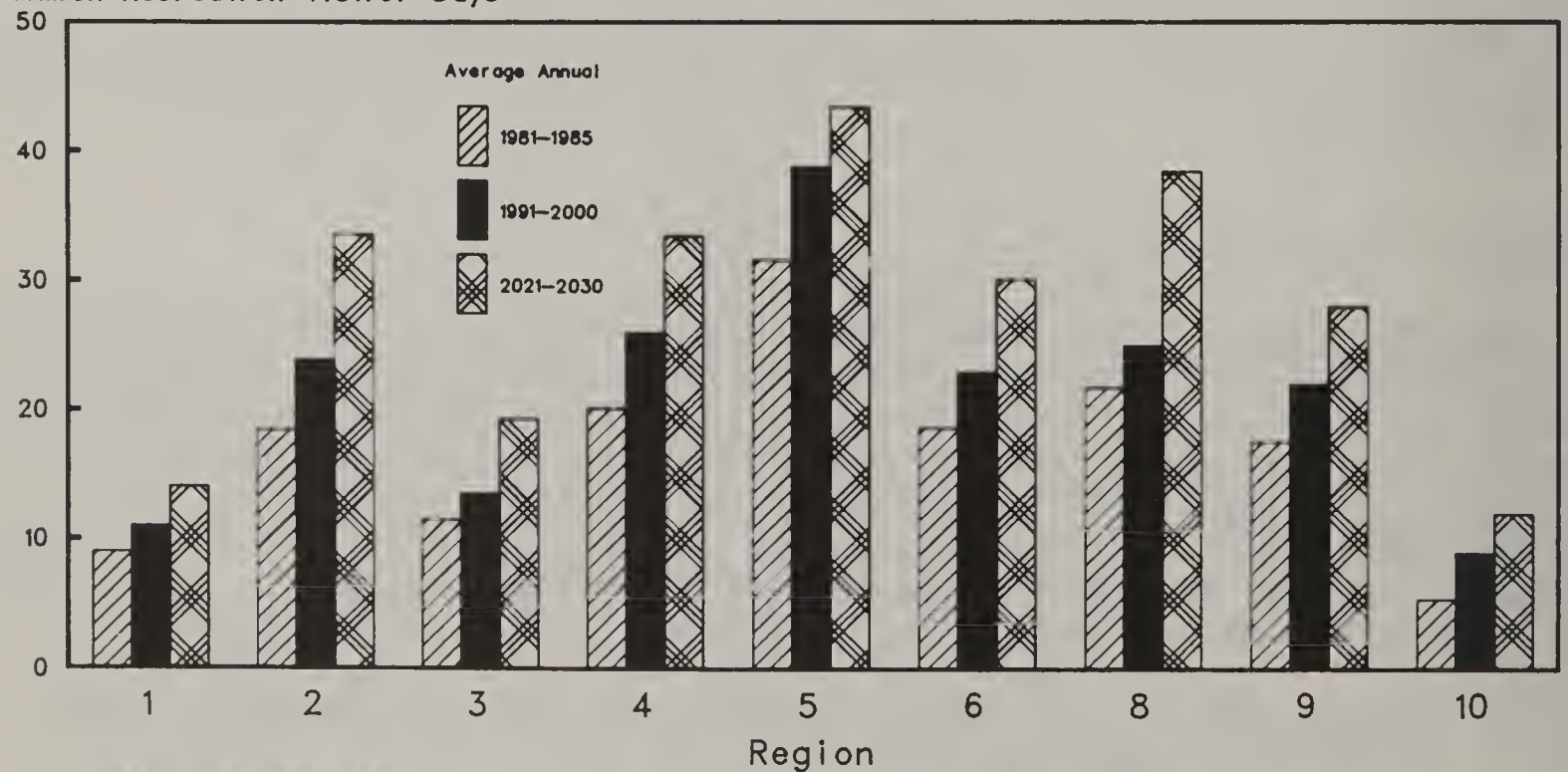


Figure 3.3

Regional Estimates-Alternative 1 Dispersed Recreation Use (NFS)

Million Recreation Visitor Days



- Provide quality outdoor recreation for the benefit of the public to meet national needs, and utilizing the private sector as demand allows.
- Provide orientation and/or interpretive services at all developed recreation sites and many dispersed areas.
- Expand technology for planning and managing visual resources.
- Provide for an expanded construction program for trails and related facilities (figure 3.4).
- Provide full-level services at all developed sites and dispersed areas.
- Because of increased activity in all resource areas, the Forest Service will need to increase work on archeological and historical identification and preservation.

State and Private Forestry.--Planning and technical assistance for private and non-Federal public forest lands would be increased to promote optimum capabilities for dispersed recreation (figure 3.5). Forest management plans would emphasize recreation and esthetics, as well as other multi-resource opportunities; and forest landowners would be advised of the various benefits available through recreation-oriented management.

Research.--New knowledge would be produced and published on current recreation use and users, benefits, costs, and future demands. New technology would improve methods to inventory recreational resource supplies, to coordinate public and private supplies, and to predict future supplies. Methods would be developed to improve facility designs, scenic qualities, and integration of recreation with other resource uses. Procedures would be investigated to improve user safety and education, reduce vandalism and user conflicts, and improve public involvement. New technology would also be developed to improve cultural resource inventories, analyses, and understanding.

Figure 3.4

Regional Estimates-Alternative 1 Trail Construction-Reconstruction (NFS)

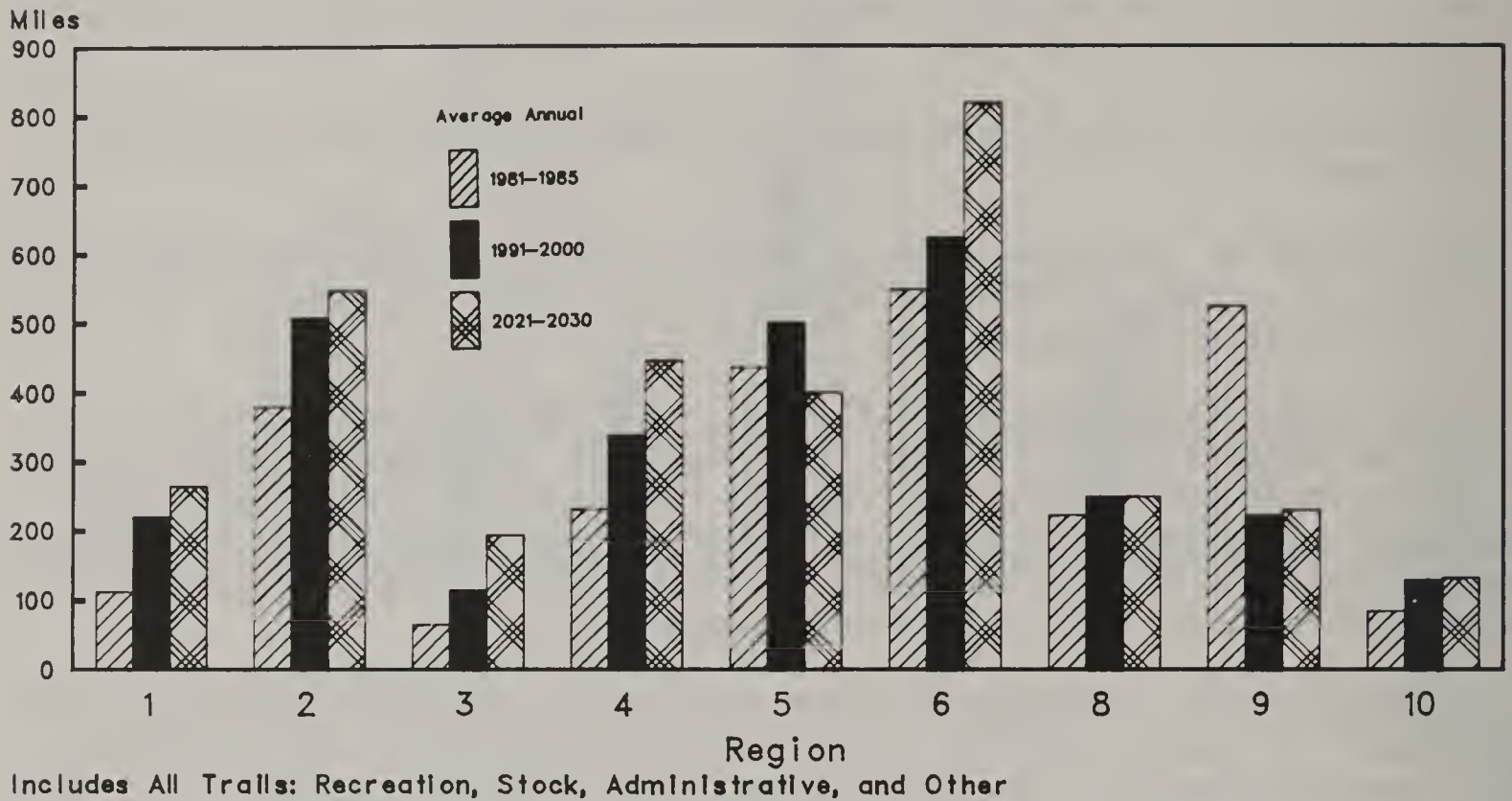
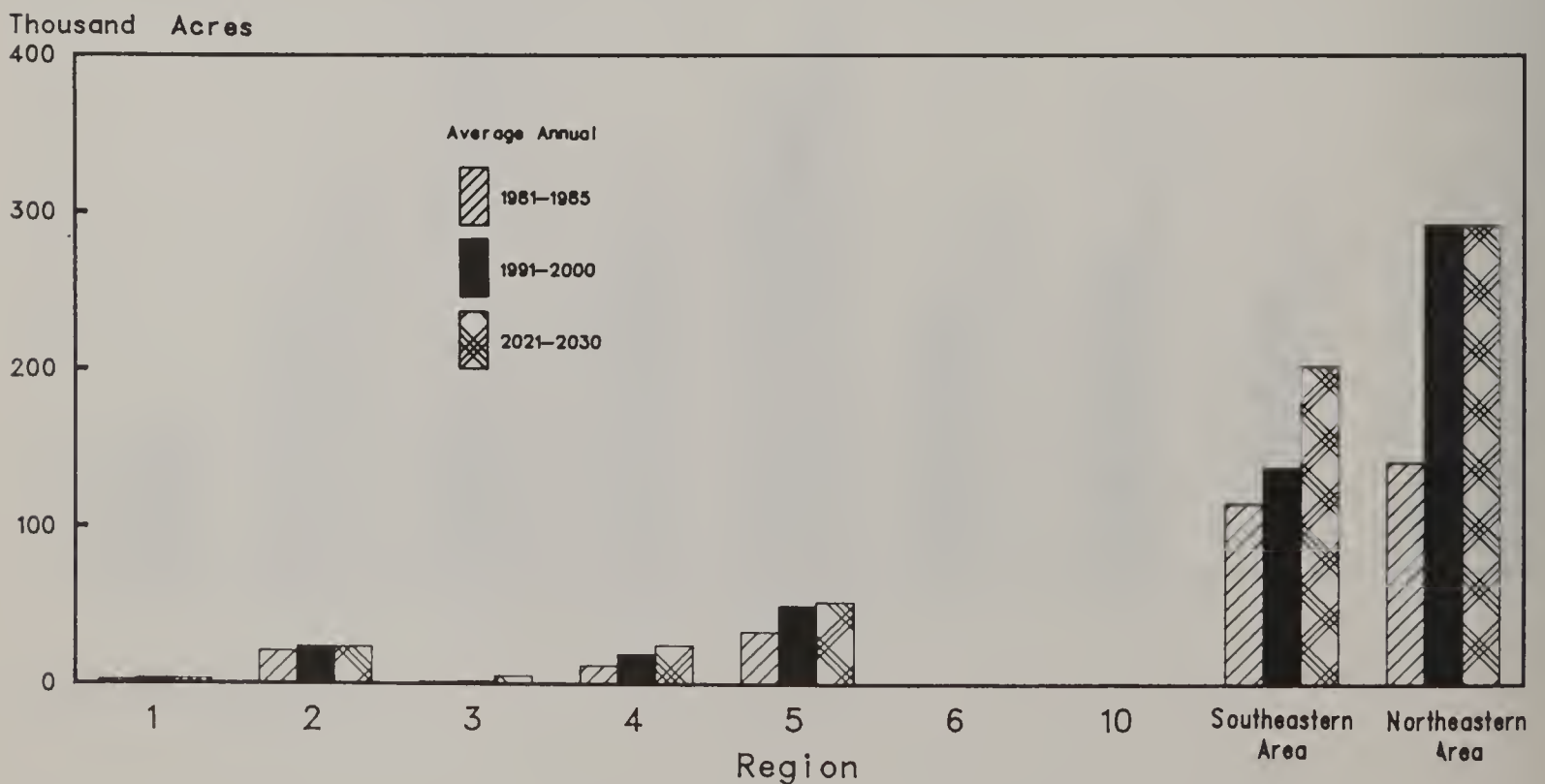


Figure 3.5

Regional Estimates-Alternative 1 Technical Assistance for Dispersed Recreation (S&PF)



National Goals

Wilderness designation, NFS.--Recommend substantial new wildernesses that contain a wide range of values for primitive recreation; solitude; natural integrity; naturalness; and ecological, geological, or other features of scientific, educational, or historical value.

Wilderness management, NFS.--Provide for a substantial increase in wilderness use, protection of wilderness values, reduction of conflict, and greater opportunity for experiences in less utilized wildernesses. Maintain a wide range of conditions for primitive recreation; solitude; natural integrity; naturalness; and ecological, geological, or other features of scientific, educational, or historical value.

Wilderness research.--Increase the development and use of scientific knowledge regarding management and protection of primitive recreational opportunities, solitude, natural integrity, naturalness, and ecological, geological, and other features of scientific, educational, scenic, or historical value.

Outputs and Activities

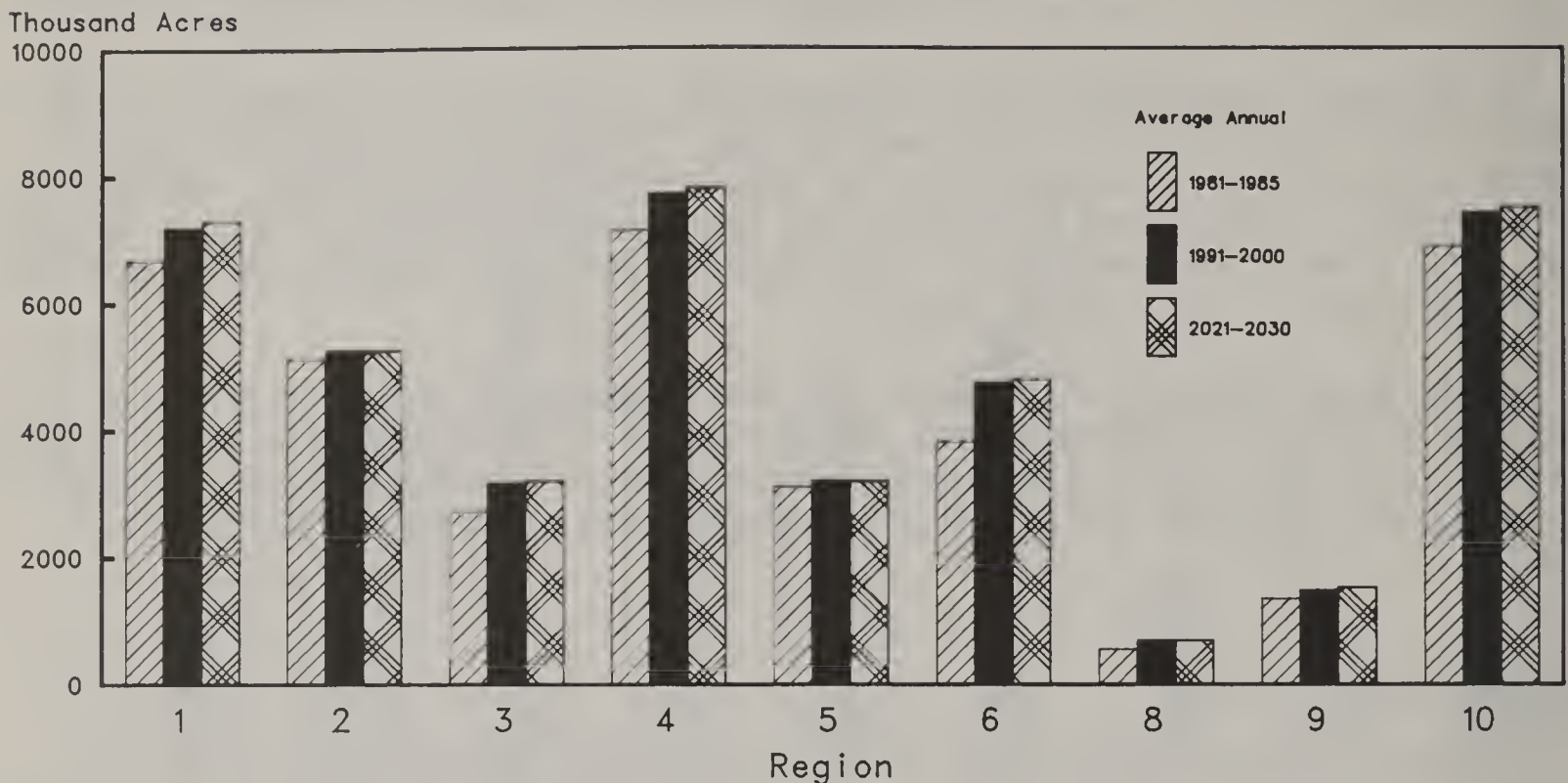
National Forest System.--The increase of approximately 26 million acres (middle of range) for wilderness under this Alternative, as depicted in figure 3.6 and the projected national outputs in table 3.1, would round out the National Forest System contribution to the National Wilderness Preservation System (NWPS). Specific areas are not identified for any Alternative. However, selected areas would contain a substantial representation of the four characteristics of landform, ecosystem, presence of wilderness-associated wildlife, and accessibility and distribution considered in the RARE II program.

Within Alternative 1, a substantial increase in use of wilderness would be realized from additional wilderness acreage added to the Wilderness System, and from more intensive management of existing wildernesses. Additional seasonal personnel would be employed as wilderness rangers to carry out administrative duties. Additional efforts would be implemented to inform the public about wilderness and its use.

Research.--Research would produce ways to measure use, explain characteristics of users, ensure a high degree of challenge in wilderness opportunities, and solve sanitation problems. Research would determine how to: (1) maintain isolation from sights, sounds, and the presence of others; (2) ensure that long-term ecological processes remain intact; (3) identify endangered or threatened species; (4) maintain unusual plant or animal communities; and (5) measure the significance of geological processes, scenic quality preservation, and historic and prehistoric values.

Figure 3.6

Regional Estimates-Alternative 1 Wilderness Management (NFS)



Wildlife and Fish

National Goals

Endangered and threatened species, NFS.--Intensively manage habitats for species (plant and animal) on Federal and State lists to protect and maintain populations, and to enhance in conformance with recovery plans.

Habitat diversity, NFS.--Provide a high level of habitat diversity, well distributed, for all indigenous vertebrate and selected invertebrate wildlife species on management units not to exceed 10,000 acres.

Enjoyment of wildlife and fish in developed areas, NFS.--Develop all opportunities for the appreciative (nonconsumptive) enjoyment of wildlife and fish at developed recreation and VIS sites.

Fish habitat improvements, NFS.--Manage anadromous and resident fish habitat at 90 percent or more of potential.

Cooperation with others, S&PF.--Provide a high level of cooperative and technical assistance to private landowners for increased wildlife and fish production on forested lands.

Wildlife, fish, and plant habitat research.--Develop and use more scientific knowledge and methods to apply new information about game and nongame species and their habitats, including the role and response of the total array of wild fauna, vertebrates, and invertebrates inhabiting forest, rangelands,

Outputs and Activities

National Forest System.--Wildlife habitat improvements would increase from 2.3 million acre-equivalents in 1978 to 3.8 in 1985. Thereafter, maintenance and replacement would be the primary requirements, and acre equivalents of new improvements would decline to 1.6 million by 2025 (figure 3.7). Anadromous fish habitat improvements would increase the annual contribution of the National Forests to the commercial salmon fishery by 3.8 million pounds in 1985 and 25.5 in 2005 through 2025. Maintenance of both wildlife and fish habitat improvements would increase throughout the period.

It is anticipated that the population levels of certain management indicator species would change by 1995 as follows:

Management Indicator Species Index (Current Situation = 100)

<u>Species</u>	<u>Alternative 1</u>
Mule deer	133
White-tailed deer	135
Black-tailed deer	155
Elk	130
Wild turkey	170
Cavity nesting birds	80
Resident trout	125
Anadromous fish	125

Much of the wildlife and fisheries program is achieved through coordination with other resource activities, such as timber harvesting, livestock grazing, recreation developments, and road and trail construction, maintenance, and management. To achieve multiple-use requirements of both high market and nonmarket outputs would mean high coordination costs for all resources.

The high-level program in Region 8, relative to the other Regions, as displayed by figure 3.7, is due to habitat improvements resulting from utilization of opportunities for prescribed burning. Region 10 has a very small habitat improvement program. For anadromous fish, Region 10 has most of the program potential, Regions 2, 3 and 8 have none, and Region 9 has very little (figure 3.8).

This Alternative is responsive to public comments calling for increased emphasis in this area.

State and Private Forestry.--Technical and related assistance for wildlife and fish habitat improvements on private and non-Federal public forest lands would be significantly increased. This aspect of the Rural Forestry Assistance program would be particularly intensive in the Northeast (figure 3.9), where landowner interest is high and potentials for increased production of game and nongame species on private lands are great. State forestry agencies in cooperation with State wildlife agencies and other USDA agencies would be encouraged to provide wildlife biologists to coordinate wildlife habitat assistance, provide onsite specialist assistance, and train foresters to recognize and help implement wildlife habitat improvement opportunities.

Figure 3.7

Regional Estimates-Alternative 1 Wildlife Habitat Improvement (NFS)

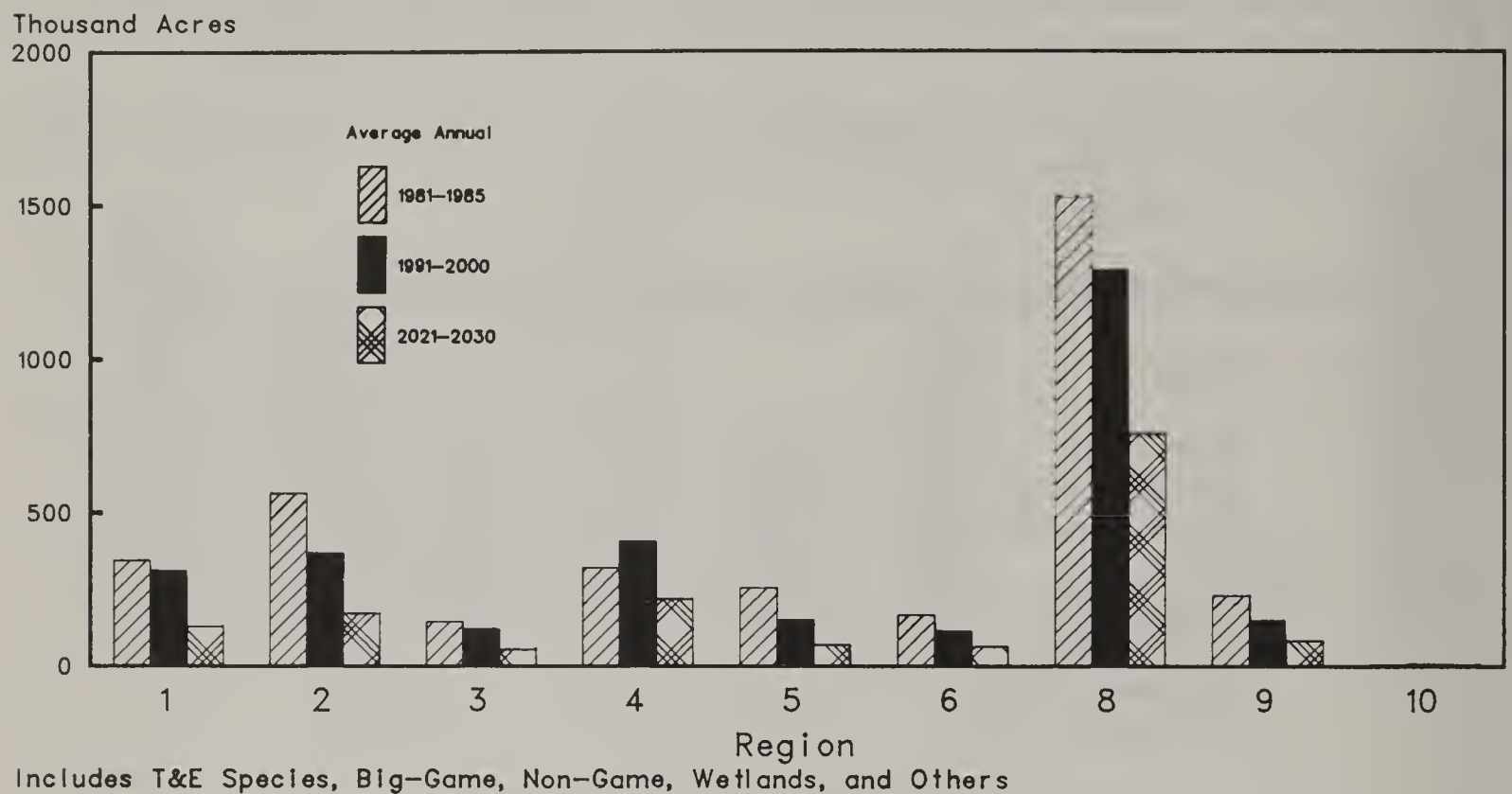


Figure 3.8

Regional Estimates-Alternative 1 Anadromous Fish (NFS)

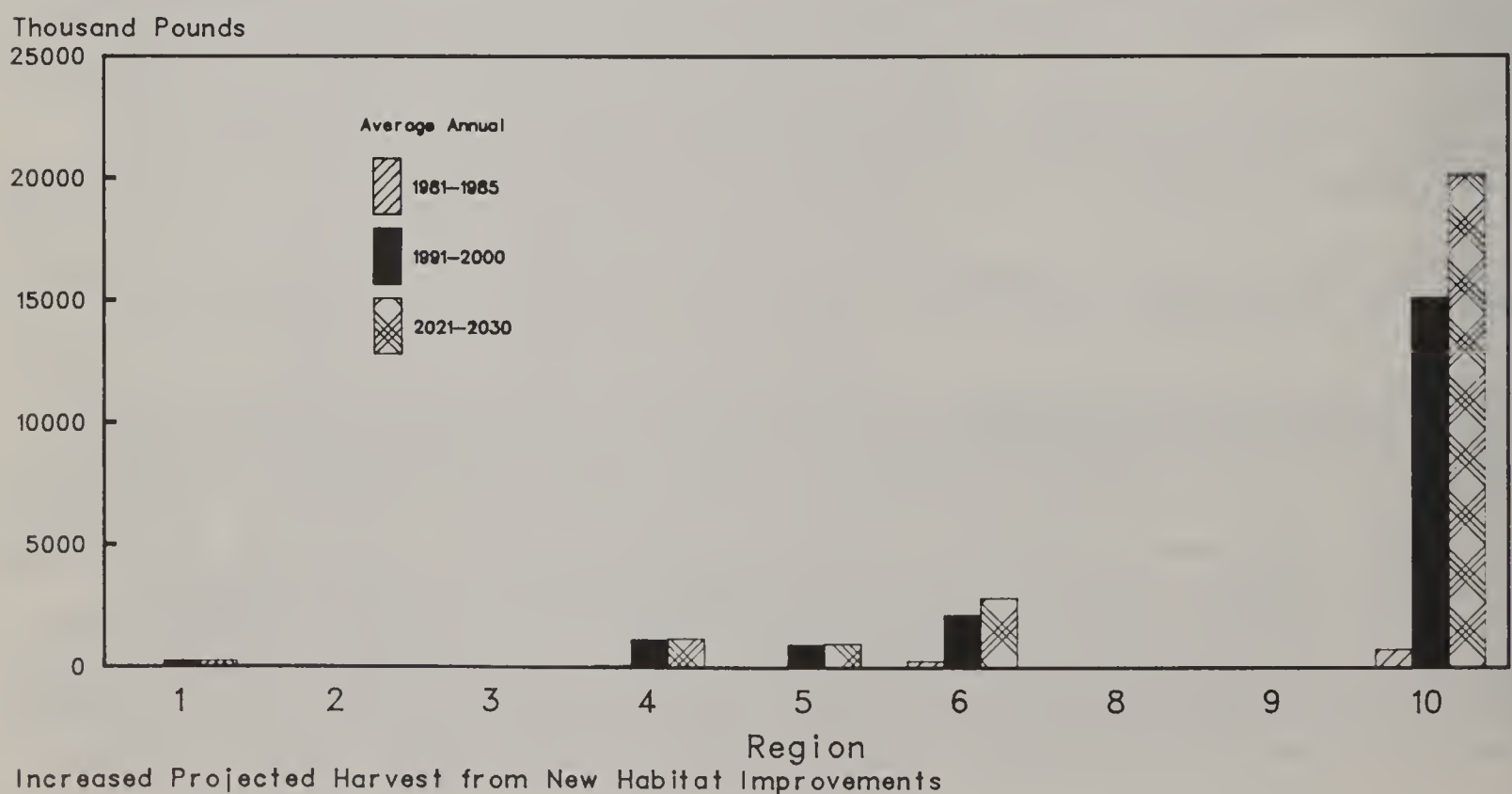
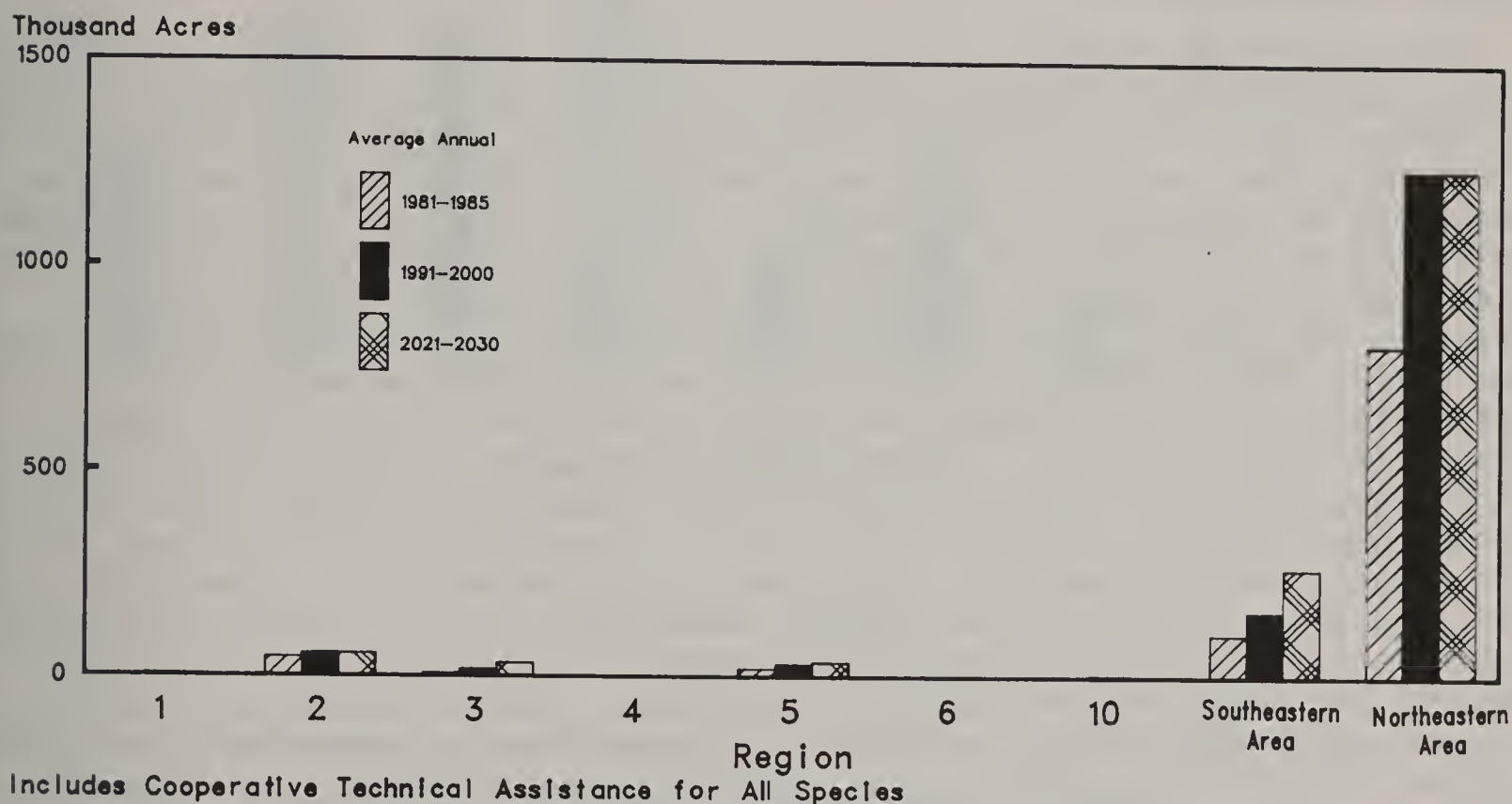


Figure 3.9

Regional Estimates-Alternative 1 Technical Assistance for Wildlife Habitat Improvement (S&PF)



Research.--New and relevant scientific information would be produced for game and nongame fish and wildlife species and their habitats. Such data would enhance the capability of managers to allocate multiple resources and to integrate the consumptive and nonconsumptive uses of fish and wildlife with other resource values. A better understanding of wild vertebrates and invertebrates and their roles in the ecosystem complex would result. The dissemination of new information would have important consequences and provide modes for immediate action by decisionmakers. Management strategies to enhance supplies of wild fauna would be developed and demonstrated to meet future demands.

National Goals

Range management, NFS.--Increase forage production and use of forage for livestock grazing by increasing number of permitted livestock; permit grazing within presently ungrazed ecosystems; install and repair additional structural improvements; make nonstructural improvements to augment native vegetation and other uses; and treat rangeland in unsatisfactory condition to eliminate environmental damage and increase productivity.

Cooperation with others on non-Federal forested ranges, S&PF.--Expand cooperation and technical assistance on non-Federal forested ranges in cooperation with other agencies.

Range research.--Expand development and use of scientific knowledge to increase livestock production for all range ecosystems.

Outputs and Activities

National Forest System.--Livestock grazing use in the National Forest System would increase from the present 9.9 million animal-unit-months to 15.5 by the year 2025. Accomplishing this would require increasing coordination with other resources uses, utilizing transitory range opportunities and concentrating on grazing the most productive lands. Lands having less potential would only be lightly grazed, or grazing would be phased out. It is anticipated that grazing would be reduced from the 103 million acres presently grazed in the National Forest System to approximately 80 million acres by the year 2025. Under Alternative 1, discontinuous grazing systems such as restoration would be employed along with introduction of improved forage species on suitable sites. Low-condition rangelands, presently grazed with little opportunity for future grazing, would have grazing phased out. Returns to government would increase. Unit costs for operation and maintenance of this program would decrease as intensive use is concentrated on the most productive areas. Unit costs for capital investments, such as fencing and water developments, would also decrease. The three existing programs to evaluate and test the Range programs would be continued. The evaluation and testing program would establish cost-effective relationships as projected by the RPA Program. Shifts in grazing use, in addition to concentrating on the most productive sites, would also involve increased use of grazing opportunities on National Forests in the eastern United States (figure 3.10).

State and Private Forestry.--In cooperation with other responsible agencies, technical and related assistance for forage production on non-Federal forested ranges would be increased considerably (figure 3.11). Landowners would be informed of opportunities to manage land for range values, and they would be encouraged to include forage production in multiresource forest management plans when it is compatible with other forest resource uses and landowner objectives.

Research.--New knowledge would improve the management of range resources and increase livestock production on forests and rangelands in ways that are energy efficient and environmentally acceptable. Effective and prudent utilization of range resources would be enhanced by information from such research. The information produced would create strategies to better integrate livestock grazing regimes with the management of other range resources. Management alternatives would be developed to reclaim deteriorated ranges.

Figure 3.10

Regional Estimates-Alternative 1 Grazing Use (NFS)

Thousand Animal Unit Months

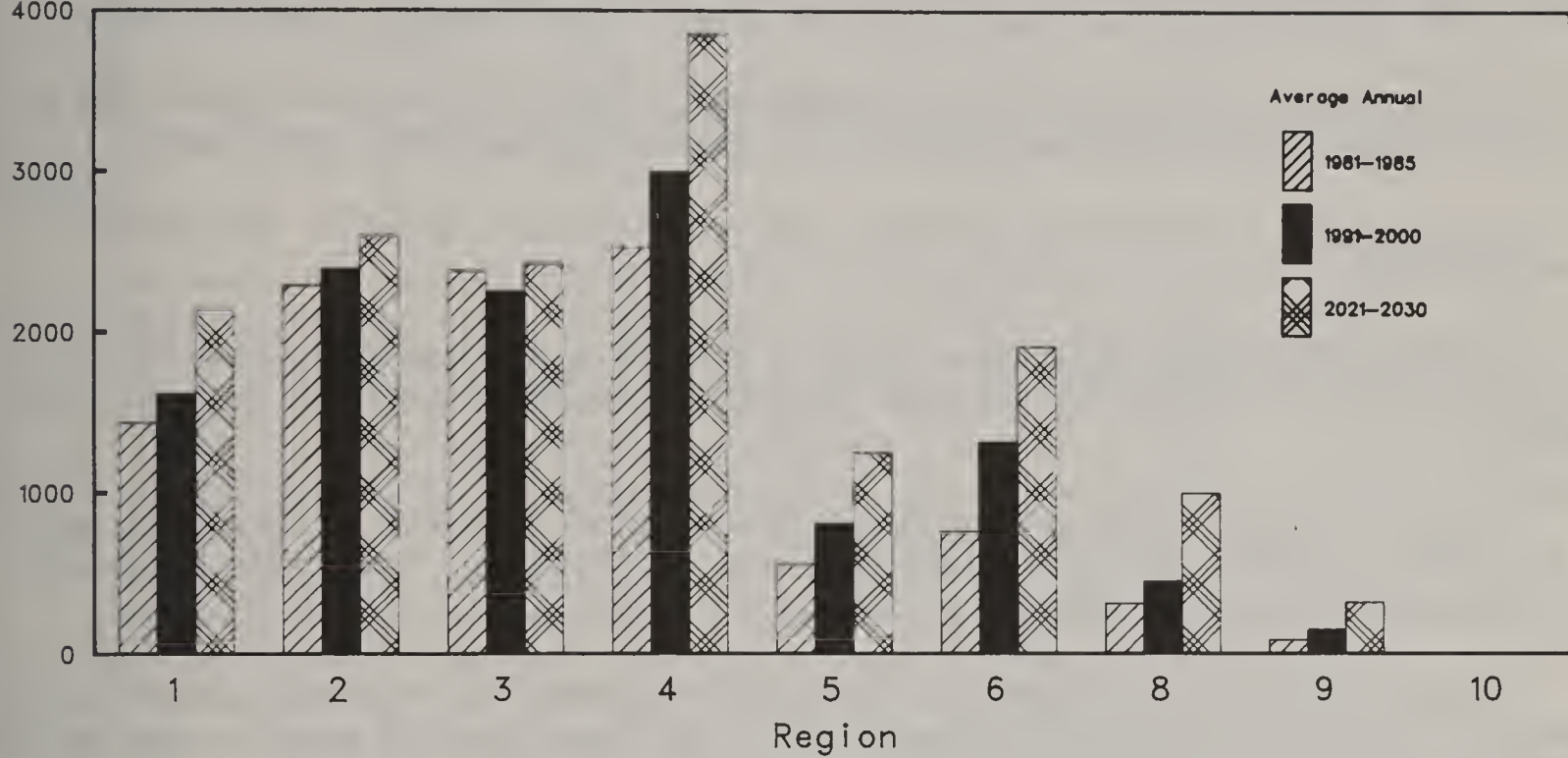
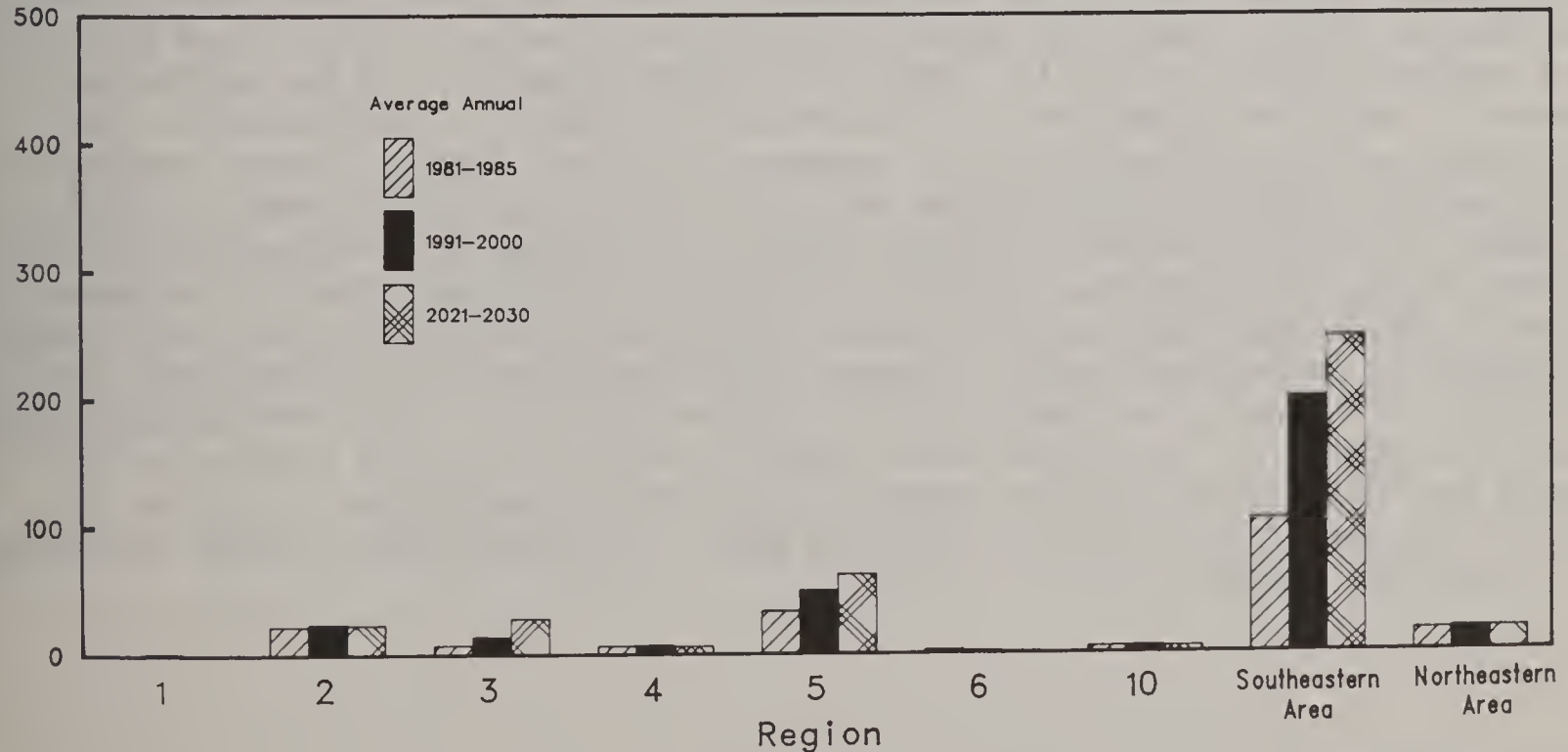


Figure 3.11

Regional Estimates-Alternative 1 Technical Assistance for Range Improvement (S&PF)

Thousand Acres



National Goals

Timber supply, NFS.--Expand timber supply to meet projected increases in demand.

Silvicultural practices, NFS.--Broaden the application of silvicultural practices on commercial forest land under management.

Wood utilization, NFS.--Make full use of available wood fiber from harvested and treated areas, especially for chemical and energy conversion.

Cooperation in private forest management, S&PF.--Stimulate expansion of private timber supply and application of improved management practices.

Cooperation in wood utilization, S&PF.--Stimulate greatly increased use of wood fiber.

Timber management research.--Accelerate basic and applied research to support intensive and extensive multiresource timber culture to fullest site potential.

Forest products utilization research.--Expand research programs on wood as an energy source, biomass assessment and utilization, low-grade hardwoods, and improved structural design systems.

Forest engineering research.--Initiate engineering research programs to increase efficiency and reduce waste in harvesting, control erosion and pollution, and more effectively collect biomass for energy; accelerate research in harvesting and transportation of low-grade hardwoods and residues.

Outputs and Activities

National Forest System.--Annual timber sale offerings would expand from 12.2 billion bd. ft. local scale in 1978 to 17.9 billion bd. ft. in 2025 (figure 3.12). Harvesting, including full use of regeneration and intermediate and salvage harvests, would be extended to all commercial forest land by the year 2000. Harvest would be accelerated within sustained yield principles for overmature timber stands to increase effective growth. Strict stocking level and species control over all commercial timber stands would be maintained. Harvests would be scheduled to accelerate attainment of desired age-class structure and distribution on all commercial forest lands. Annual reforestation would increase to 449,000 acres in 1988 and to 532,000 acres by 2025. Figures 3.13 and 3.14 show the NFS regional breakdown of reforestation and timber stand improvement. Prompt reforestation with genetically improved growing stock would be required on all regeneration-harvested and any catastrophically deforested lands. Timber stands would be fertilized where the response is known to be desirable and cost effective. While recognizing other resource needs, all available wood fiber from harvested and treated areas would be used, especially for chemical and energy conversion. A total of 556,000 acres of reforestation backlog would be regenerated to meet projected increases in demand.

For NFS, Alternative 1:

- Aggressively supports a wood-for-energy concept, as this Alternative produces the most harvest residues through intensive management to maximize biomass production.
- Most strongly supports RPA goals to increase softwood production from National Forests to dampen stumpage price increases and provide stability in regional forestry employment.

State and Private Forestry.--Expanded Forest Service financial and technical assistance programs would provide incentives for proper sale, techniques for improving harvesting and processing efficiency, as well as increased and improved timber growth. Emphasis on timber harvesting from National Forests could dampen prices slightly, which might reduce incentives for private landowners.

Increases in assistance for reforestation (figure 3.15), timber stand improvement (figure 3.16), preparation of timber for harvest (figure 3.17), and woodland owners assisted (figure 3.18) during the period 1981-2030 would significantly increase the private timber production potential attributable to the Federal-State cooperative programs. Similarly, wood volume increases would be realized from increased wood utilization assistance in most Regions (figure 3.19).

Research.--Timber management research: A significant program of basic and applied research would be directed toward increased knowledge of multiresource timber culture to achieve fullest site potential. New management guides that emphasize regeneration with genetically superior stock, intensive early culture, and multiresource management alternatives would be developed and published for all commercial forest tree species. Management strategies would be developed for all types of forest ownerships. A strong program of basic research would provide the basis for new technological advances in culture and management of forest trees. Emphasis would be on obtaining maximum productivity from all sites.

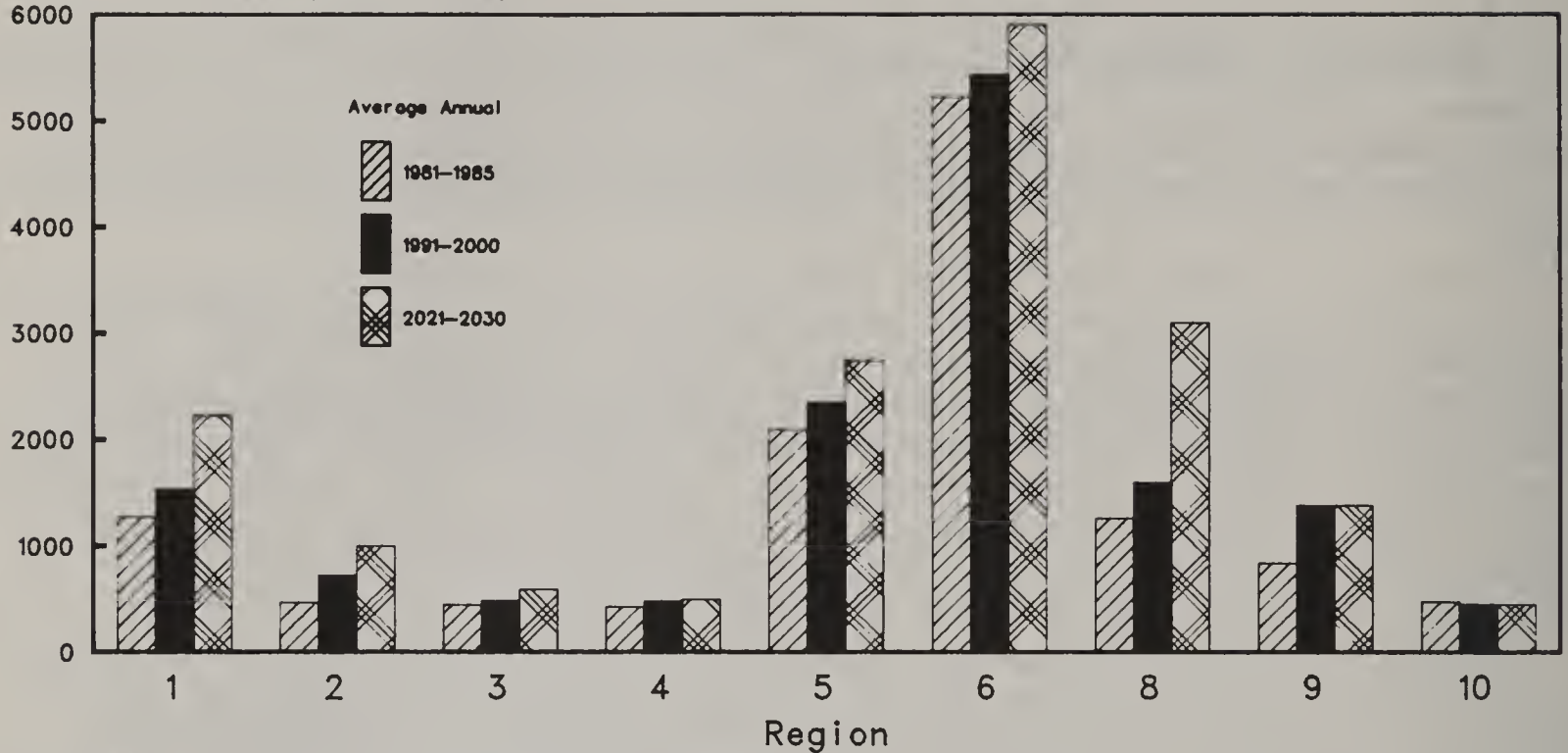
Forest products utilization research: Research would assess biomass production and value. Wood combustion systems would be demonstrated to the wood products industry to ensure energy self-sufficiency. Design criteria resulting from research would be established for engineered wood structures. Technical data would be provided from accelerated research directed toward greater utilization of hardwood timber.

Forest engineering research: Research would determine and demonstrate the benefits of removing low-grade hardwoods and logging residues from public and private lands. Evaluations would be conducted to determine the national advantages of biomass energy as a replacement for nonrenewable energy sources. Reports would be available on the most effective methods and long-term benefits of erosion and pollution control required during high-volume harvesting operations.

Figure 3.12

Regional Estimates-Alternative 1 **Programmed Sales Offered (NFS)**

Million Board Feet (Local Scale)

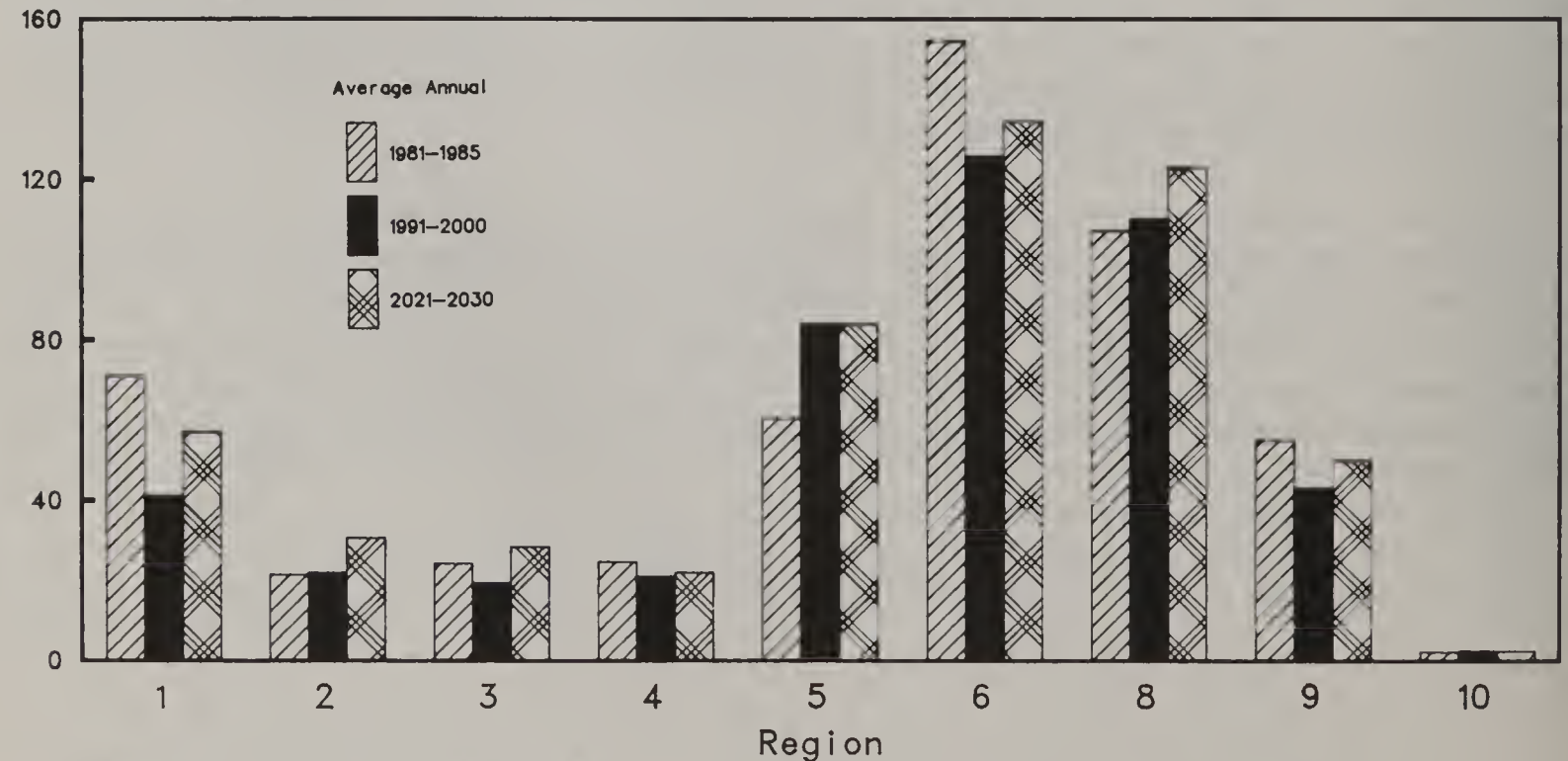


Includes Live and Mortality; Hardwood and Softwood

Figure 3.13

Regional Estimates-Alternative 1 **Reforestation (NFS)**

Thousand Acres



Includes KV and Appropriated Funds

Figure 3.14

Regional Estimates-Alternative 1 Timber Stand Improvement (NFS)

Thousand Acres

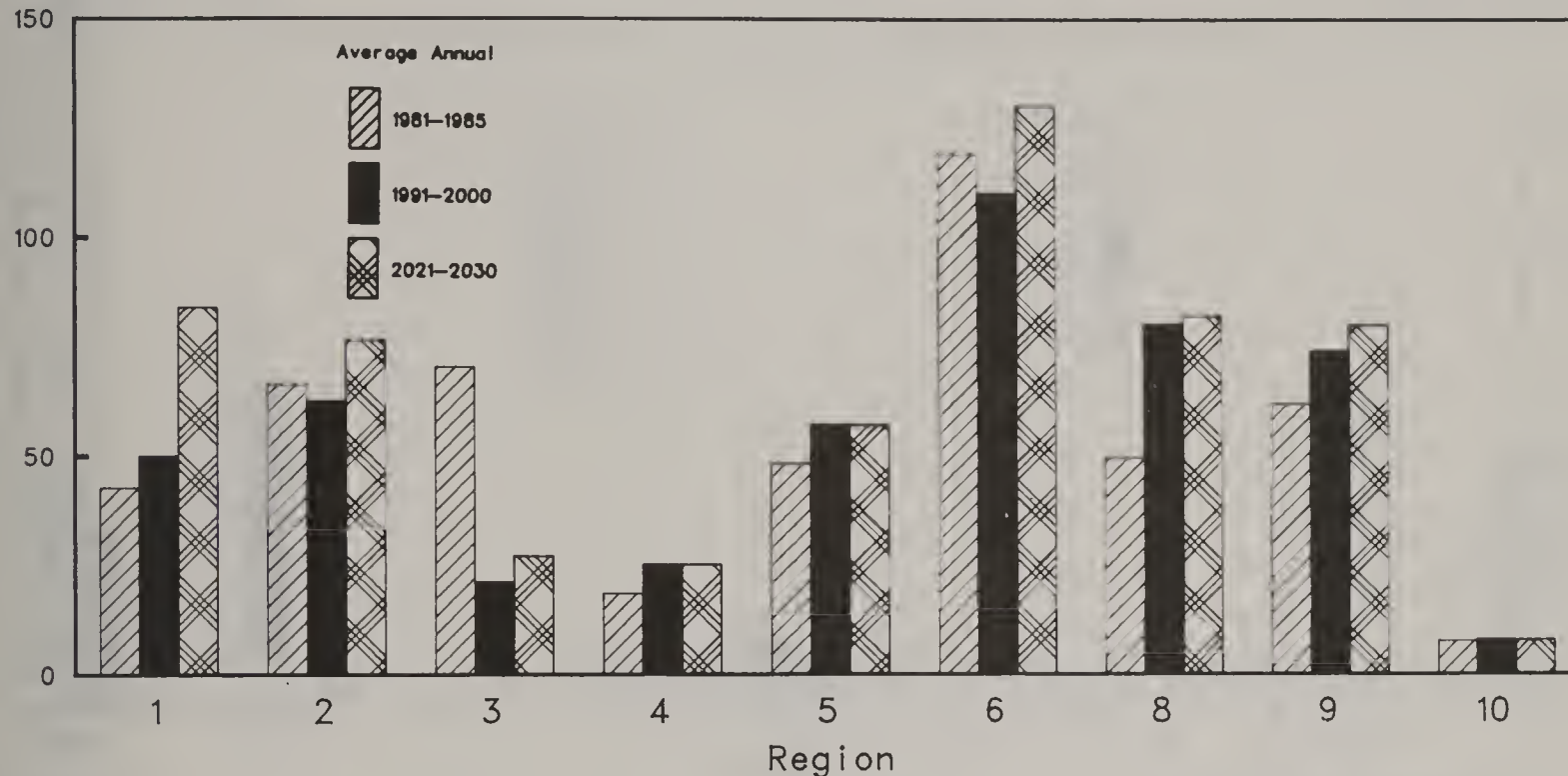
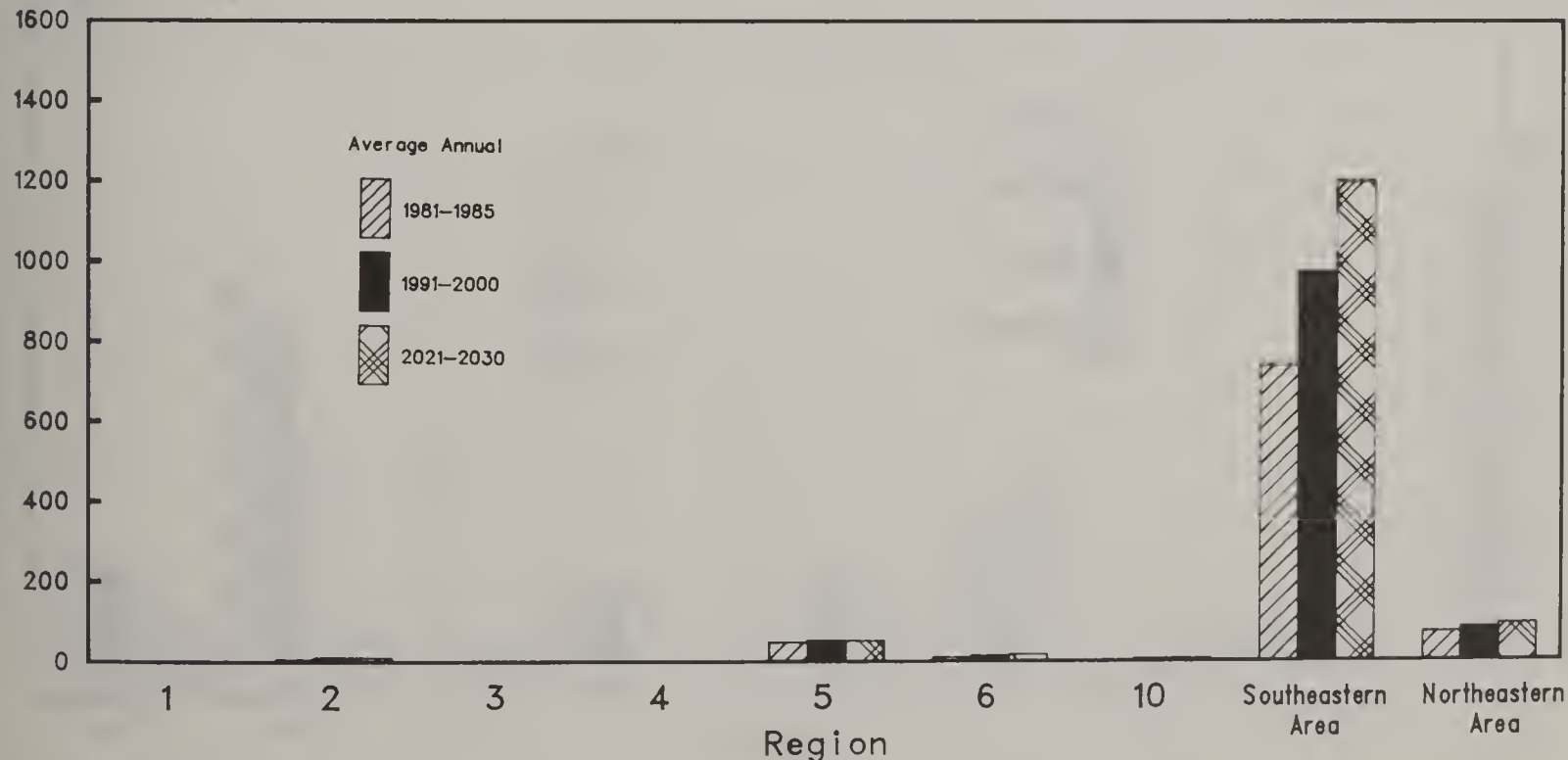


Figure 3.15

Regional Estimates-Alternative 1 Reforestation (S&PF)

Thousand Acres



Includes RFA, FIP, and ACP

Figure 3.16

Regional Estimates-Alternative 1 Timber Stand Improvement (S&PF)

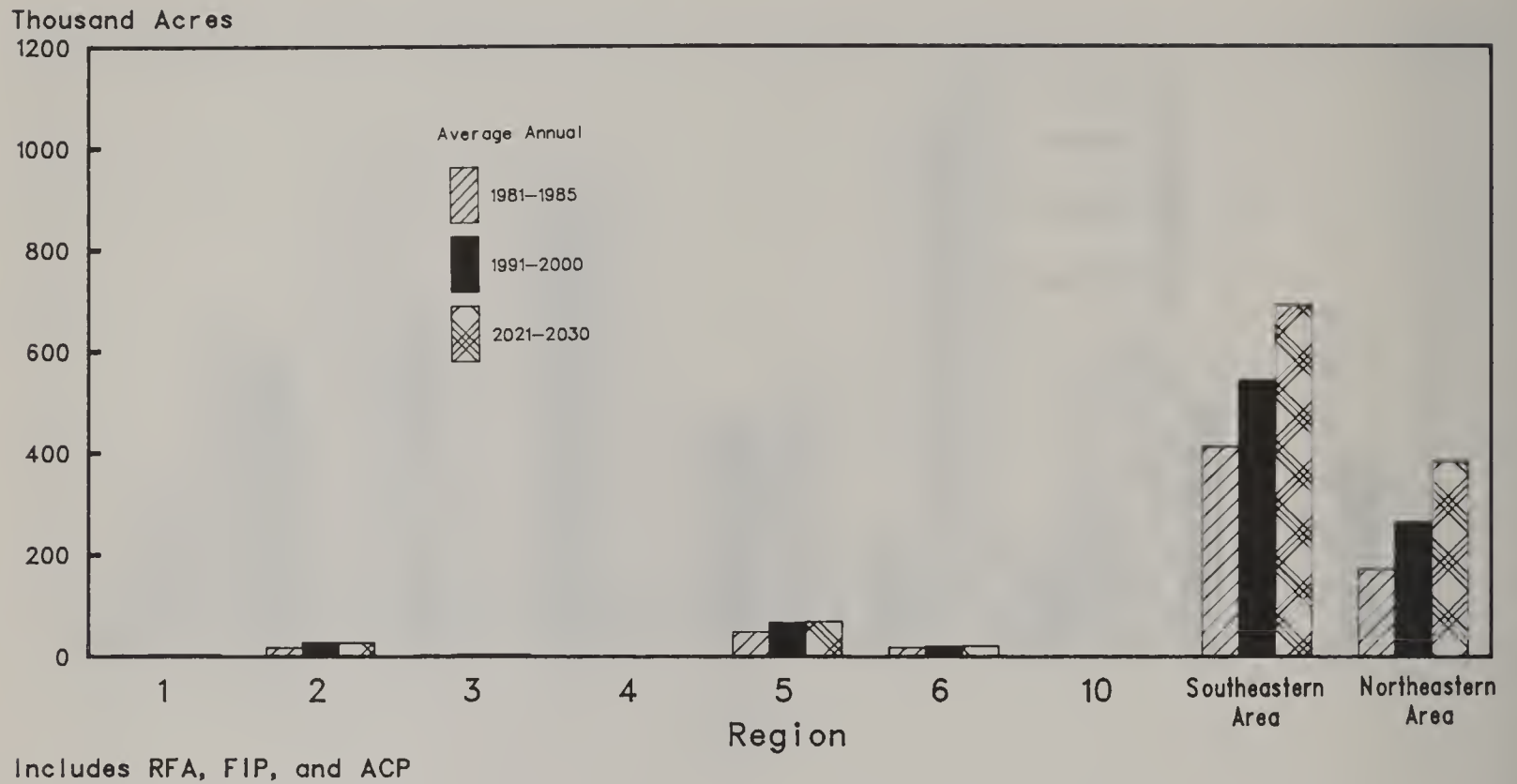


Figure 3.17

Regional Estimates-Alternative 1 Timber Prepared for Harvest (S&PF)

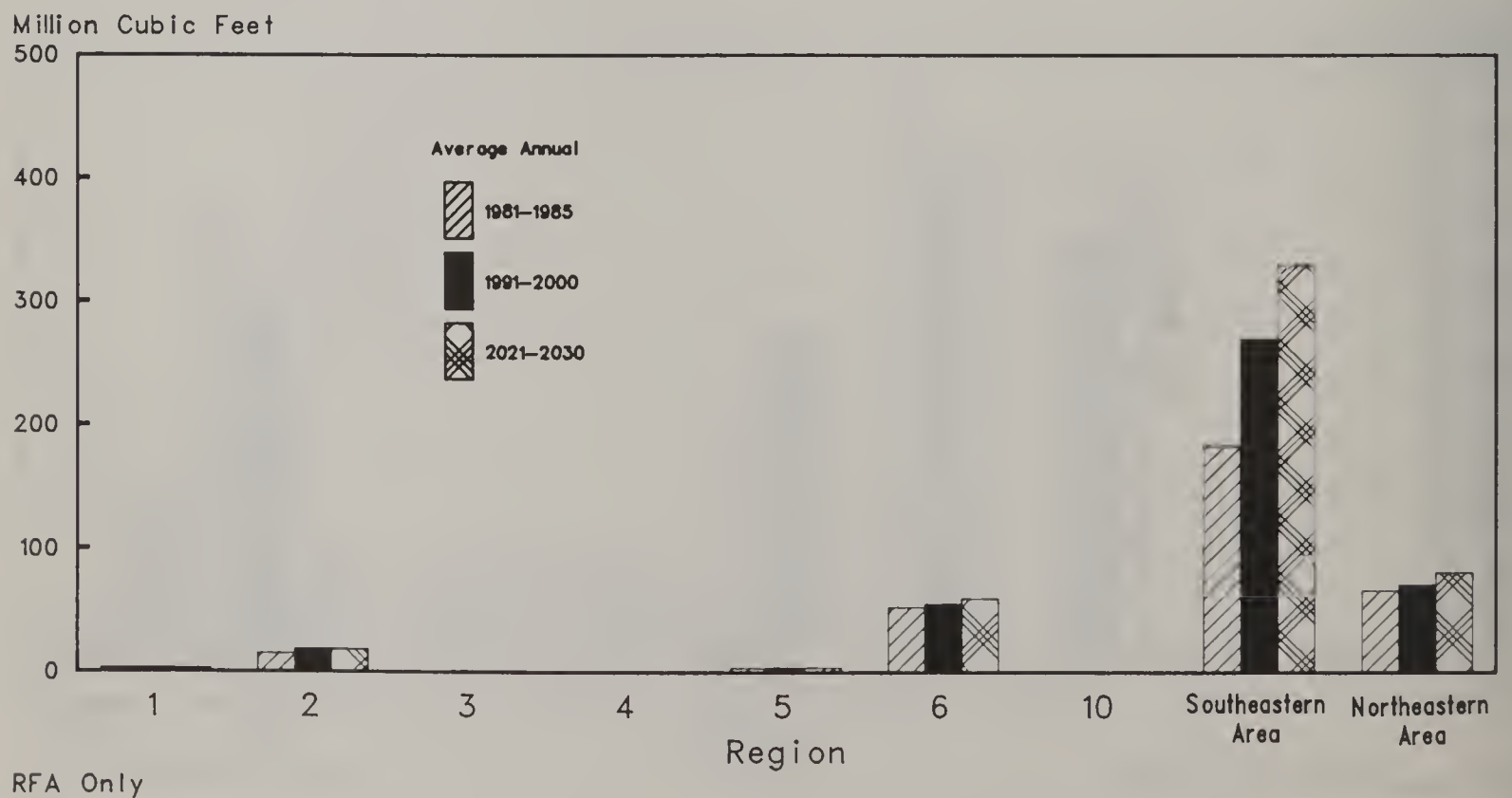


Figure 3.18

Regional Estimates-Alternative 1 Woodland Owners Assisted (S&PF)

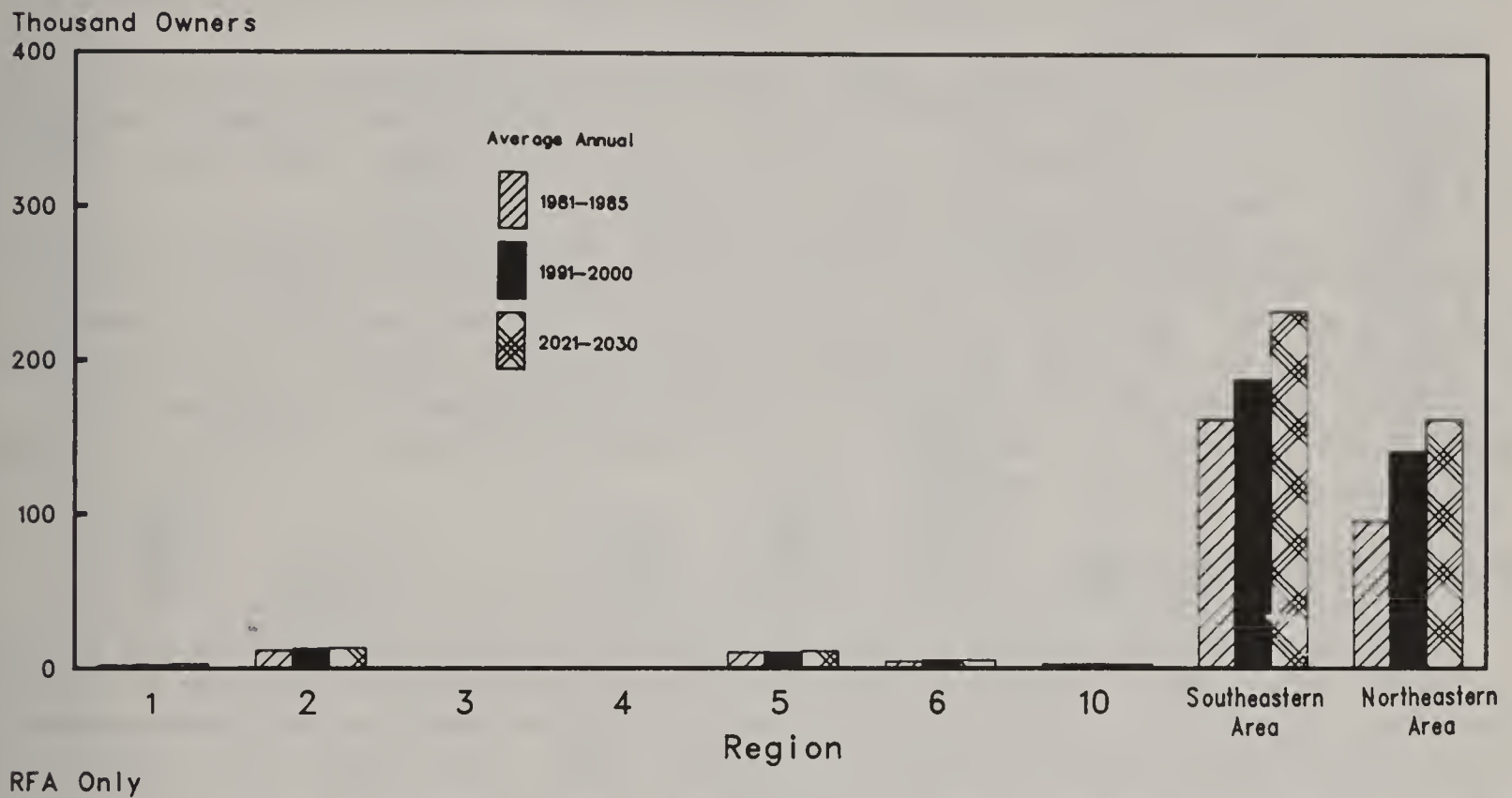
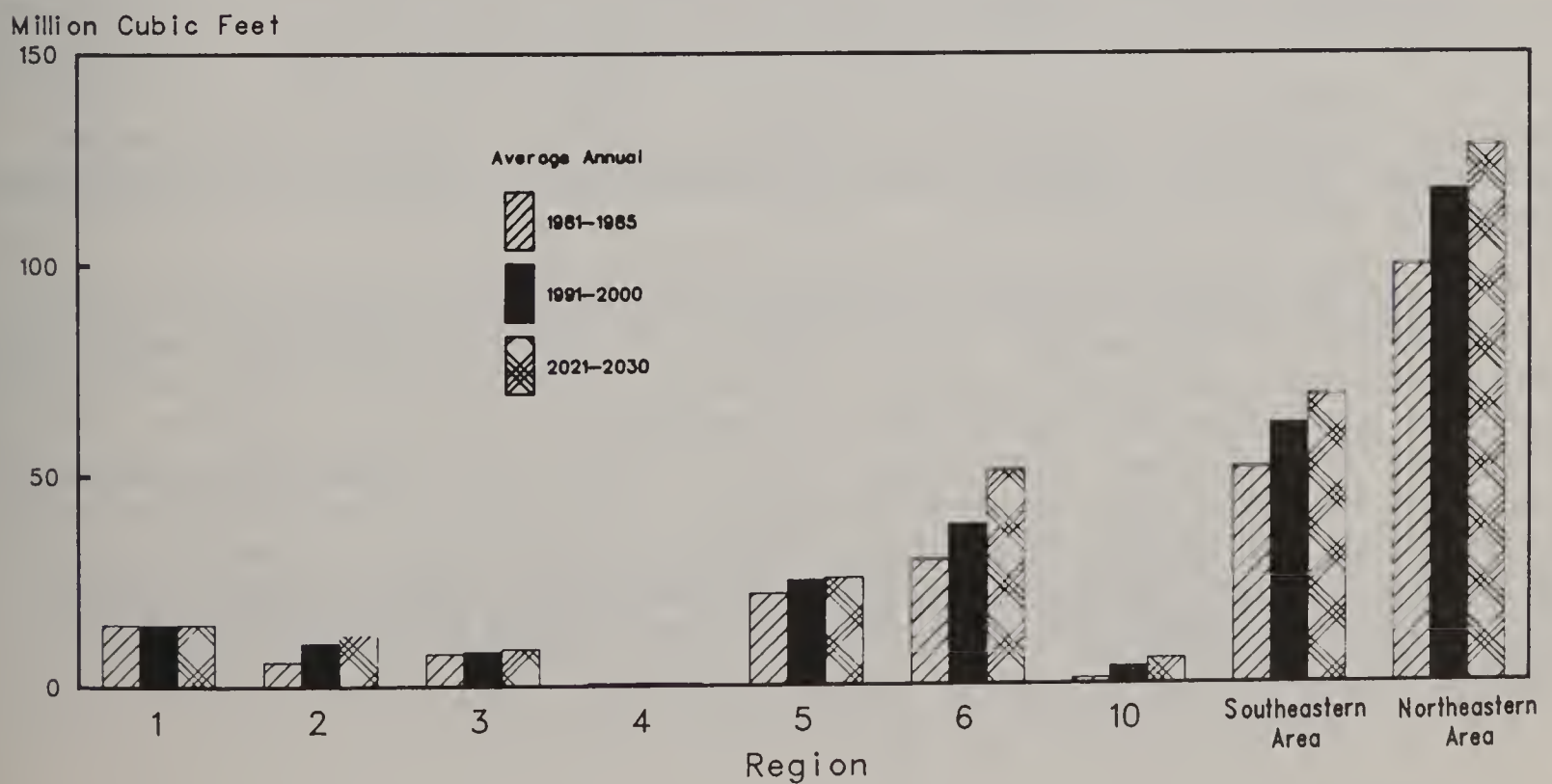


Figure 3.19

Regional Estimates-Alternative 1 Improved Wood Utilization (S&PF)



National Goals

Technical water support services, NFS.--Provide a full range of technical water support services needed to maintain and generally improve water quality and water yield.

Water quality improvement, NFS.--Implement intensive water resource improvements to enhance water quality.

Water yield, NFS.--Implement intensive water resource improvements to increase water yield.

Cooperation with others, S&PF.--Accelerate coordination, planning, and implementation of water quality and water yield activities through assistance, cooperation, and involvement of private forest landowners and Federal, State, and local organizations responsible for water.

Water resource research.--Substantially increase development and use of scientific knowledge to provide onsite water resources of adequate quantity and quality for recreation and propagation of fish and wildlife; increase water yields for offsite uses wherever economically feasible; eliminate discharge of pollutants with emphasis on maintaining aquatic ecosystems and ecological, geological, and other water resource features of scientific, educational, or historical value.

Outputs and Activities

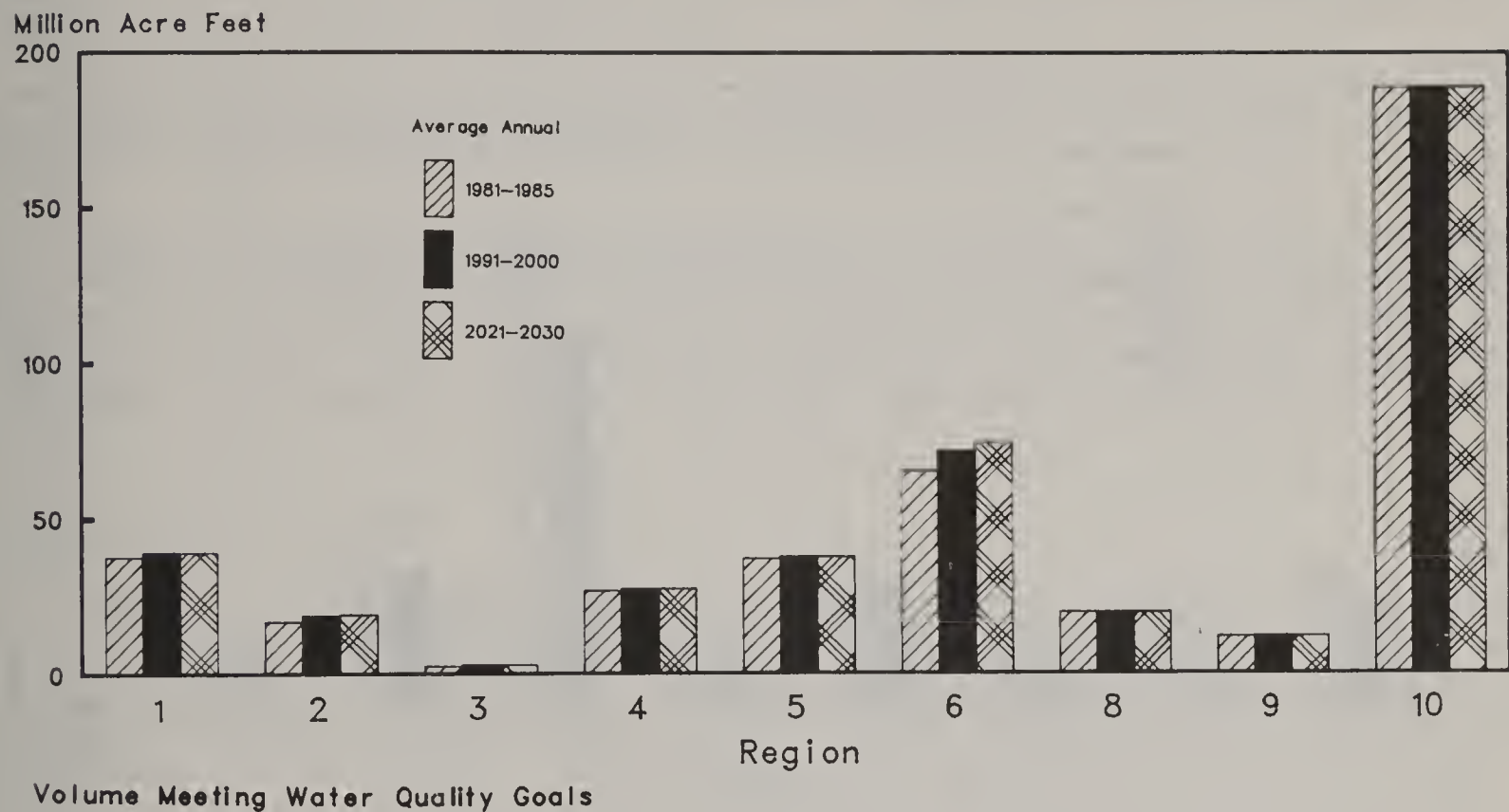
National Forest System.--Water activities in this element exceed support services required for nondegradation of the water resource because of other resource activities. Water quality goals would be met for all water yielded from the National Forest System by the year 2000. The detail and quantity of water resource inventories would increase as management intensified to produce high levels of outputs. Resource improvements to increase natural water yield and maintain quality would be implemented. Increased maintenance of water resource improvement projects would be provided to prevent further damage to the water resource from natural events. In comparison to current water yields, the quantity of water would increase. The volume of water meeting water quality goals is presented in figure 3.21.

State and Private Forestry.--Significantly more technical and financial assistance would be available for protecting and improving the quality, quantity, and timing of water yields from non-Federal forest lands. Emphasis would be placed on plans and practices to: improve water quality, incorporate watershed management principles in forest resources planning, develop best management practices, improve municipal watersheds, improve streamside management, and stabilize soil.

Research.--Research would determine the water resource amenities and requirements for recreation and propagation of fish and wildlife, especially threatened and endangered species. Hydrologic processes of forest ecosystems would be quantified and the effects of management practices on water yield and distribution evaluated. Techniques would be developed to maximize snowpack yield and reduce evapotranspiration losses. Nonpoint source pollution would be assessed, its effect on aquatic ecosystems evaluated, and control measures developed. Unique aquatic ecosystems and water features of scientific and historical value would be identified and their water resource requirements evaluated.

Figure 3.21

Regional Estimates-Alternative 1 Water Quality (NFS)



Minerals

National Goals

Operations, NFS.--Process mineral proposals in a timely manner. Fully integrate proposals and resulting activities with other resource plans and needs.

Assistance to State and private landowners, S&PF.--Provide increased technical assistance to States and private landowners for planning related to mineral operations and reclamation of disturbed lands.

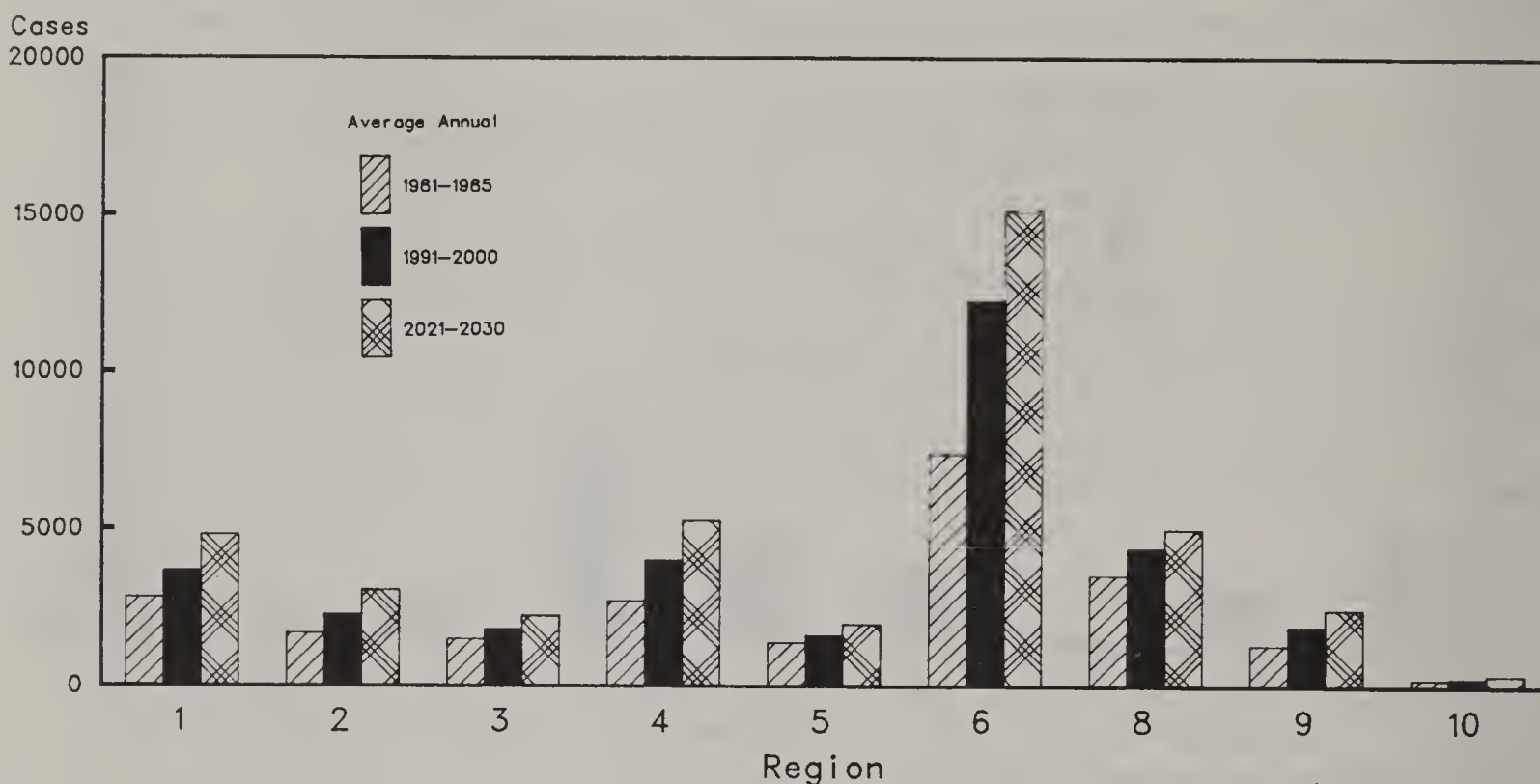
Surface environment and mining research.--Develop and use more scientific knowledge to meet water quality standards for streamflow from mined areas, improve esthetics, recreational opportunities, wildlife habitats, and range and timber productivity on mined areas; maintain integrity of undisturbed ecosystems near mined areas, and protect and maintain valuable ecological, scientific, and educational sites.

Outputs and Activities

National Forest System.--This Alternative would provide maximum efforts to process a predictable increase in mineral lease and permit applications and operating plans, and the expeditious completion of environmental studies and reports. It would be possible to develop and administer an estimated 18,900 operating plans in the year 1981 and 40,300 by 2030 (figure 3.22).

Figure 3.22

Regional Estimates-Alternative 1 Mineral Leases and Permits (NFS)



Increased mineral activities on National Forest System lands under this Alternative would produce a maximum amount of fuel with acceptable environmental impact. Increased efforts would be made to ascertain the mineral potential for consideration in land management planning, and to develop public information programs on improved techniques for removing minerals. Considerable efforts would be made to ensure proper use of mining claims under the 1872 mining laws, and to ensure against trespass.

State and Private Forestry.--Emphasis would be placed on providing technical and program support to State forestry agencies in mining reclamation activities. Coordination with programs and activities of other agencies would be optimized. Immediate, midterm, and long-range problems and opportunities for enhancing forestry aspects associated with mining would be addressed.

Research.--Research would evaluate the chemical and physical properties of mine wastes, identify potential pollutants (including heavy metals), and develop techniques for revegetation so that erosion would be minimized and streamflow water quality standards met. Techniques for mine site rehabilitation would be developed to improve esthetics, recreational opportunities, wildlife habitats, and production of timber and forage. Associated undisturbed ecosystems and sites of significant ecological, scientific, and educational values would be identified, and techniques developed for their protection. In addition, research would develop new ways to predict mineral occurrence, and chances for exploration and development.

National Goals

Employment and training program (NFS, S&PF, and Research).--Reduce present level of involvement in employment and training programs for youths, older Americans, and the disadvantaged, while maintaining basic employment and training capabilities. Encourage and assist other agencies and groups to provide special employment opportunities.

Urban and community forestry cooperation, S&PF.--Significantly increase cooperative urban forestry programs.

Urban and community forestry research.--Significantly increase development and use of scientific knowledge to assess human benefits of urban forests for Americans, understand the biological and physical processes of urban forests, maintain, utilize, and protect urban forests, and integrate urban forest management and planning into the total urban development process.

Outputs and Activities

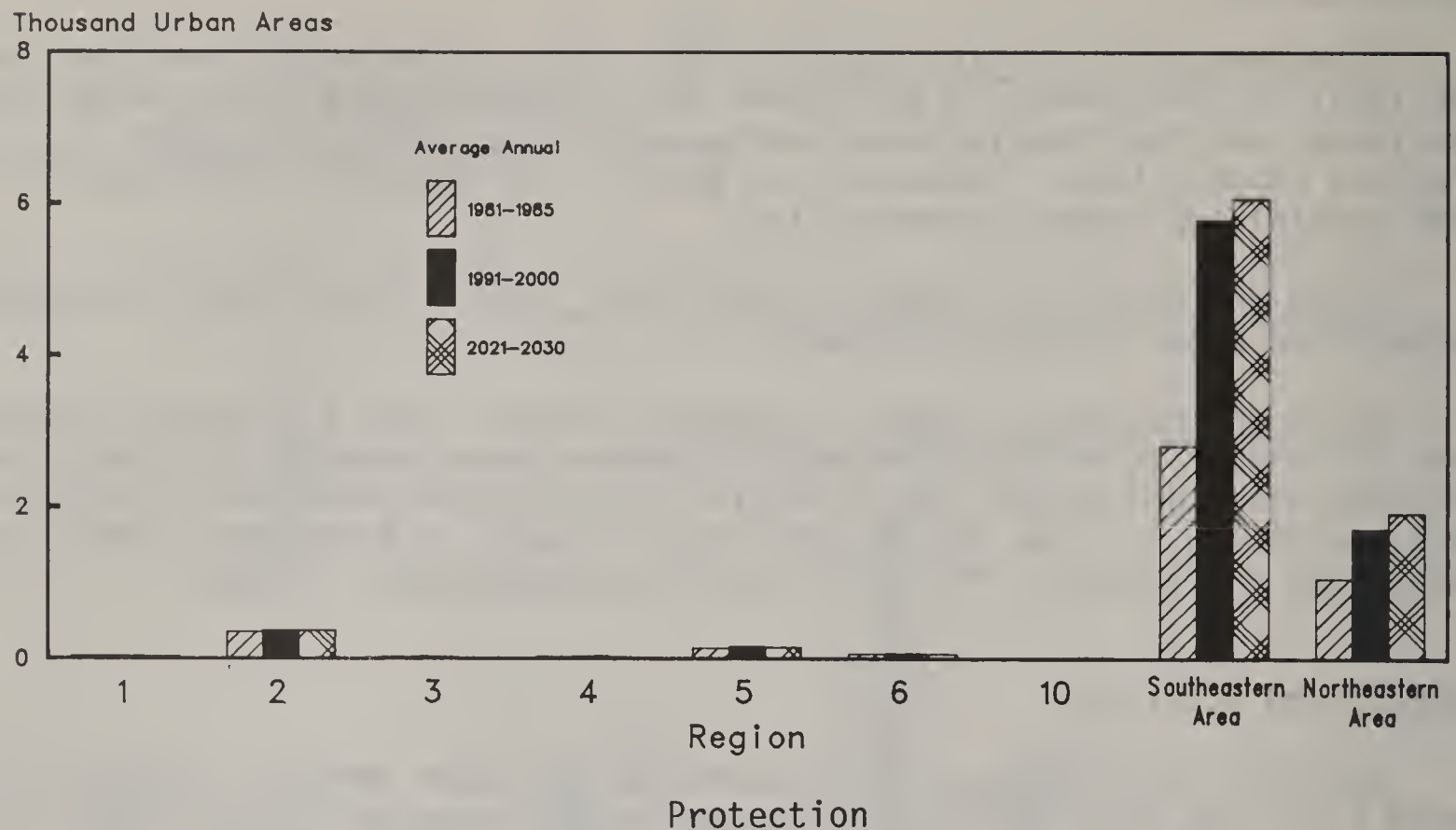
National Forest System.--In Alternative 1, human resource program staffs would work with other agencies and groups as advisors on the development and use of human resource programs. Emphasis would be placed on developing cooperative agreements to allow local groups to work on and use the facilities of the National Forest System. Funds supplied to the Forest Service for human resource programs would be largely allocated to State and local governments as grants. Within the Forest Service, programs would exist on a maintenance level below fiscal year 1978 levels but high enough to allow reimplementation in 6 months.

State and Private Forestry.--Significant increases in financial and technical assistance to States and cities for urban and community forestry would provide more Federal encouragement for cooperative efforts to plan urban forestry programs, to maintain urban trees, and to utilize their wood. The assistance would emphasize the achievement of long-term goals and objectives, as well as short-term critical needs. Special efforts would be made to direct this additional assistance to smaller communities which lack sufficient urban forestry assistance in the private sector. Regional variations in the anticipated number of urban areas to be assisted are illustrated in figure 3.23.

Research.--Research would produce information on how urban and community forests could improve physical and mental health, property values, employment, and conservation of energy. Research would determine how urban and community forests could be managed for visual quality, climatic conditions, air quality, water quality and quantity, waste-water disposal, wildlife, recreational opportunities, and wood production. Research would also develop processes to select and develop urban trees, produce quality nursery stock; and plant, grow, improve, maintain, protect, and replace urban and community forests. Research would create strategies to integrate urban forests with urban planning programs, develop information exchange systems, monitor technology related to urban and community forestry programs, and install large-scale city-wide applications of urban forest technology.

Regional Estimates-Alternative 1

Urban and Community Forestry (S&PF)



National Goals

Protection, NFS.--Provide high-level insect and disease management, fire use and management, and law enforcement activities.

Air quality, NFS.--Provide a high level of air quality management, with emphasis on studying and managing air quality related values and emissions derived from management activities. Improve residue management.

Cooperation with others, S&PF.--Accelerate and intensify technical assistance, cooperation, and cost-sharing for insect and disease control and rural fire prevention and control.

Insect, disease, and fire management systems research.--Accelerate basic and applied research and development of new and improved insect, disease, and fire management systems.

Social, economic, and environmental effects research.--Accelerate and intensify basic and allied research on methods to identify, assess, and predict net social, economic, and environmental effects of insects, diseases, air pollutants, and fire.

Outputs and Activities

National Forest System.--Provision would be made for a cost-effective fire protection and use program responsive to land and resource management goals and objectives designed to produce maximum outputs. Flammability of the forest would be reduced through expanded wood residue utilization, treatment of all fuels created by planned activities, and reduction of naturally occurring fuels, where cost effective.

Fire management outputs of NFS lands are reflected in the Fire Management Effectiveness Index--a measure of the cost of protection, plus the net damage per thousand acres protected. Estimates for the nine NFS Regions are shown in figure 3.24. Regional data are also shown for fuelbreaks and fuel treatments in figure 3.25.

Significant aspects of Alternative 1:

- The lowest overall index value of any Alternative, rising and peaking after completion of the planned fuel treatment in 1990, and declining to near initial index values by the year 2030. Total operational and investment costs would be the highest of any Alternative.
- Air-quality management would be intensified, but overall particulate and gaseous emissions from NFS lands would increase. Air quality standards would be met.
- Technical assistance, pilot projects, and suppression activities to minimize the loss and visual impact from all major insects and diseases.
- Law-enforcement activities would be expanded to provide the protection necessary for maximum production.

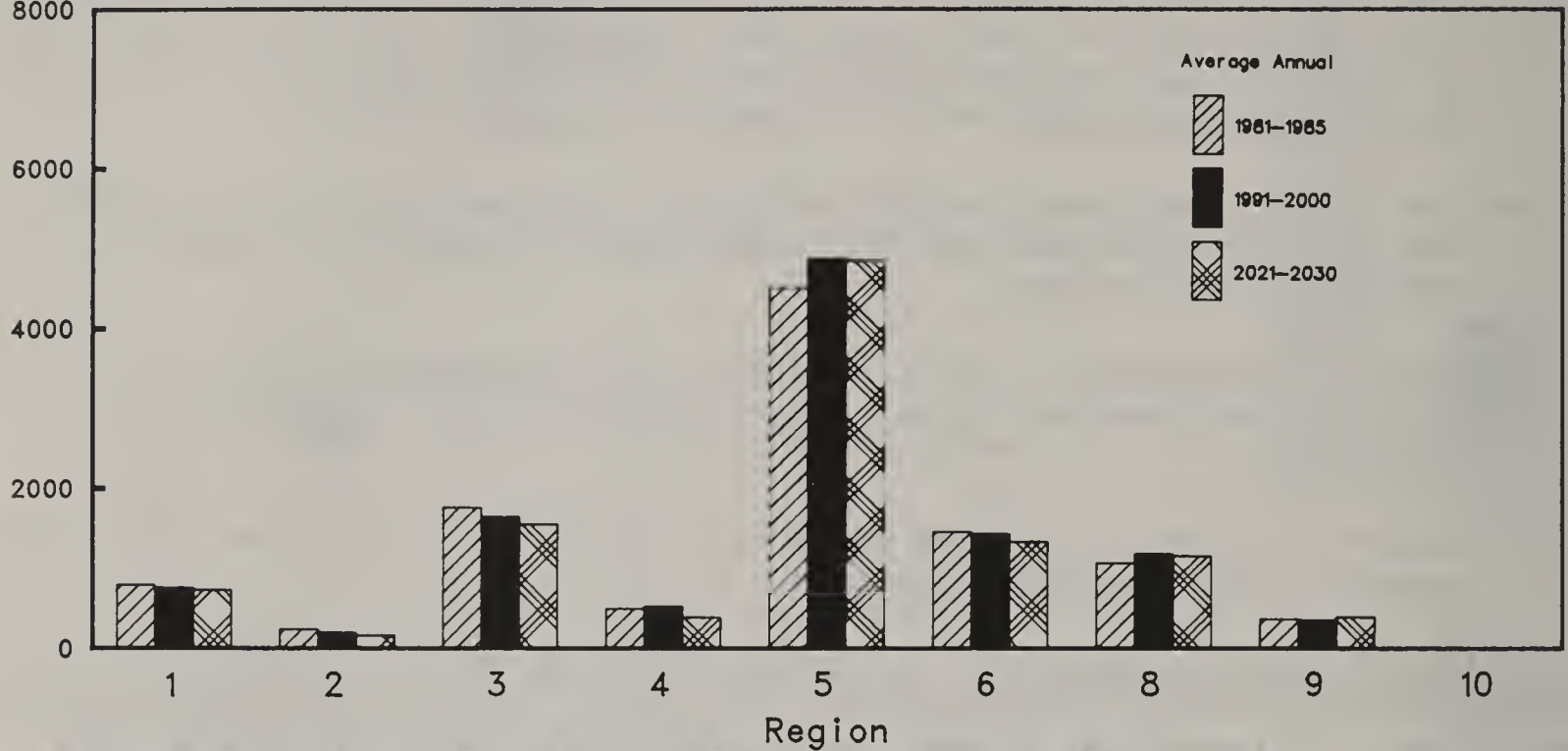
State and Private Forestry.--Insect and disease control: Direct actions on National Forest lands and cooperative actions on other public and private forest lands for insect and disease prevention, detection, evaluation, and control would be significantly increased. Regional variations in acres surveyed are illustrated in figure 3.26. Major efforts would be made to increase the consideration given to forest insects and disease in land management and resource plans, stand prescriptions, and compartment analyses. Protection against damaging insects and diseases would be greatly improved through preventive thinning practices and effective implementation of insect and disease considerations in resource planning and State program development. New technical assistance and cost-sharing programs, such as urban tree protection and protection of wood in use, would be implemented. Integrated pest management would be strengthened. Additional pilot, demonstration area, and loss assessment projects would be established. Technology transfer and knowledge utilization activities would be expanded. Increased cost-sharing and technical assistance to the States would greatly improve the States' capabilities to implement new insect and disease programs and to improve prevention, detection, and evaluation work. Additional insect and disease specialists would provide more intensive training for Federal and State field personnel for detection and prevention, and for increased technical assistance.

Rural fire prevention and control: Increased Federal financial, technical, and related assistance for rural fire prevention and control would help State Foresters, or equivalent State officials, obtain the goals outlined in their 1974 Fire Protection Analysis. Federal assistance would be increased in fire prevention techniques and programs. State fire personnel would be well trained and experienced. Efforts to improve the efficiency of fire-planning and firefighting operations would be accelerated, as would the implementation of new systems and methods in State fire organizations. Increased fire protection would enhance environmental conditions. A high level of rural fire protection would encourage private landowners to invest in management

Figure 3.24

Regional Estimates-Alternative 1 Fire Management Effectiveness Index (NFS)

Dollars/Thousand Acres
8000

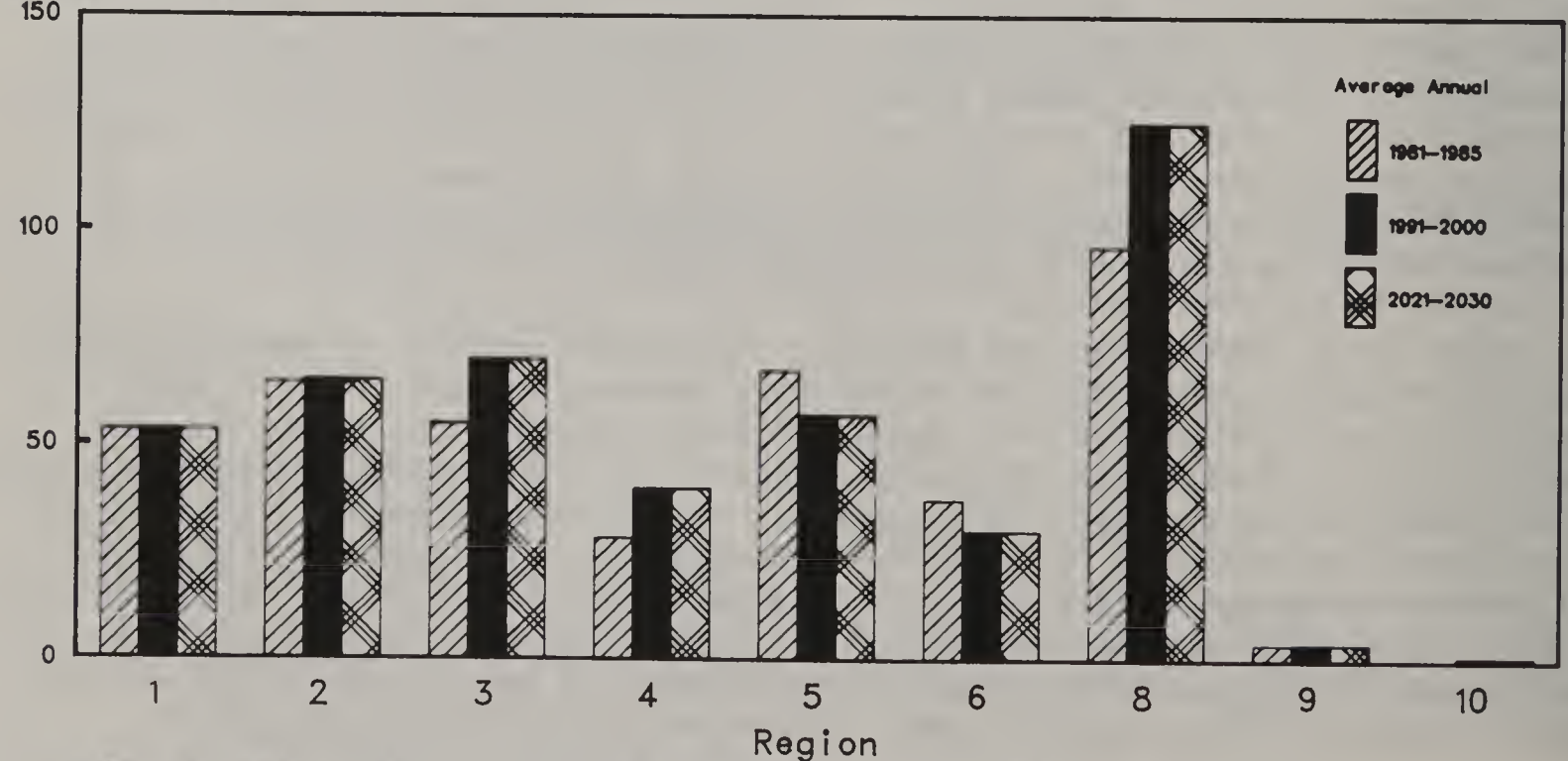


Fire Management Effectiveness Index Is a Measure of Cost Plus Loss

Figure 3.25

Regional Estimates-Alternative 1 Fuelbreaks and Fuel Treatment (NFS)

Thousand Acres
150



Includes Fuelbreak Construction and Treatment of Natural Fuels.
Excludes Treatment of Activity Fuels.

Figure 3.26

Regional Estimates-Alternative 1 **Insect and Disease Surveys (S&PF)**

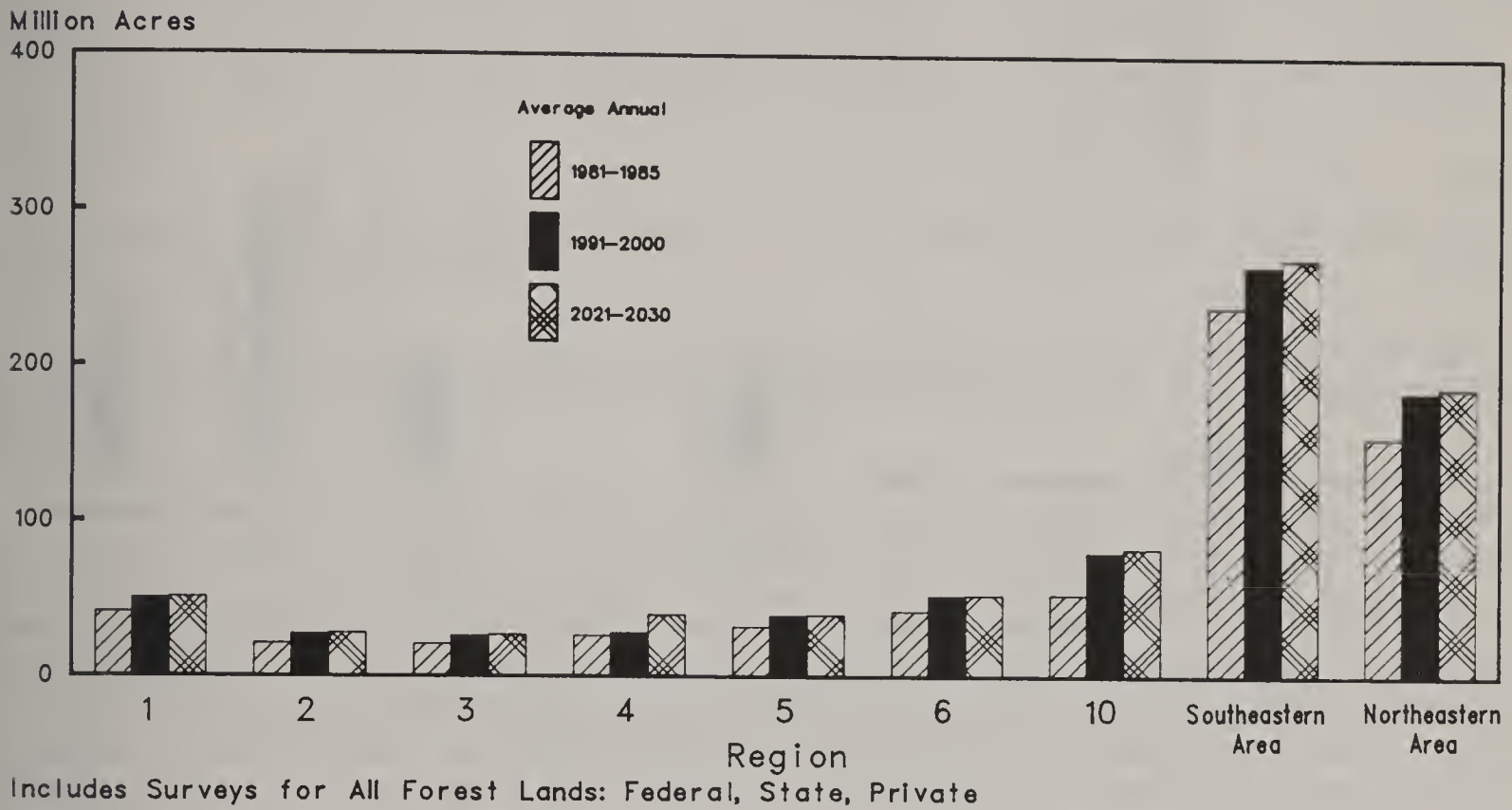
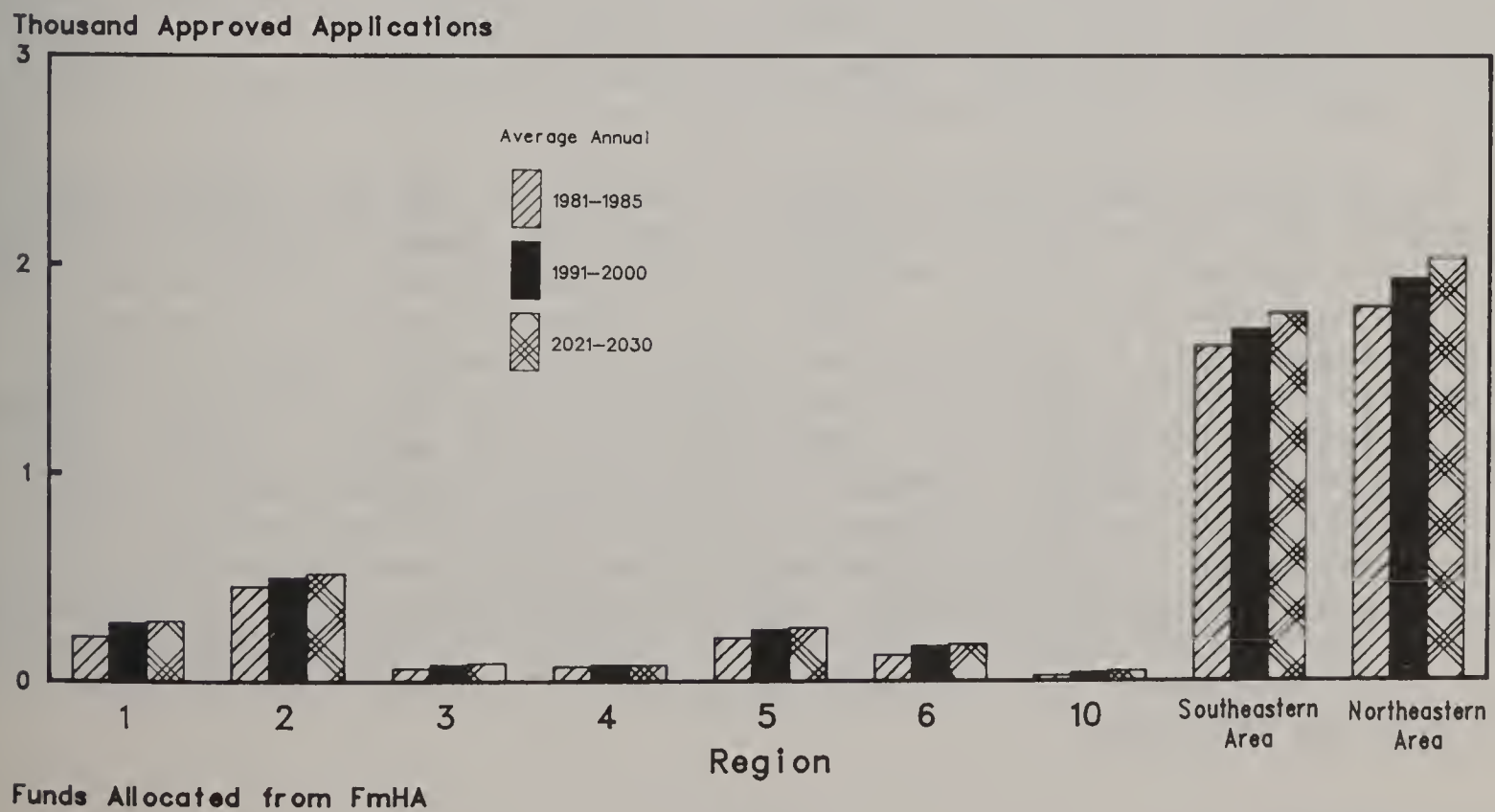


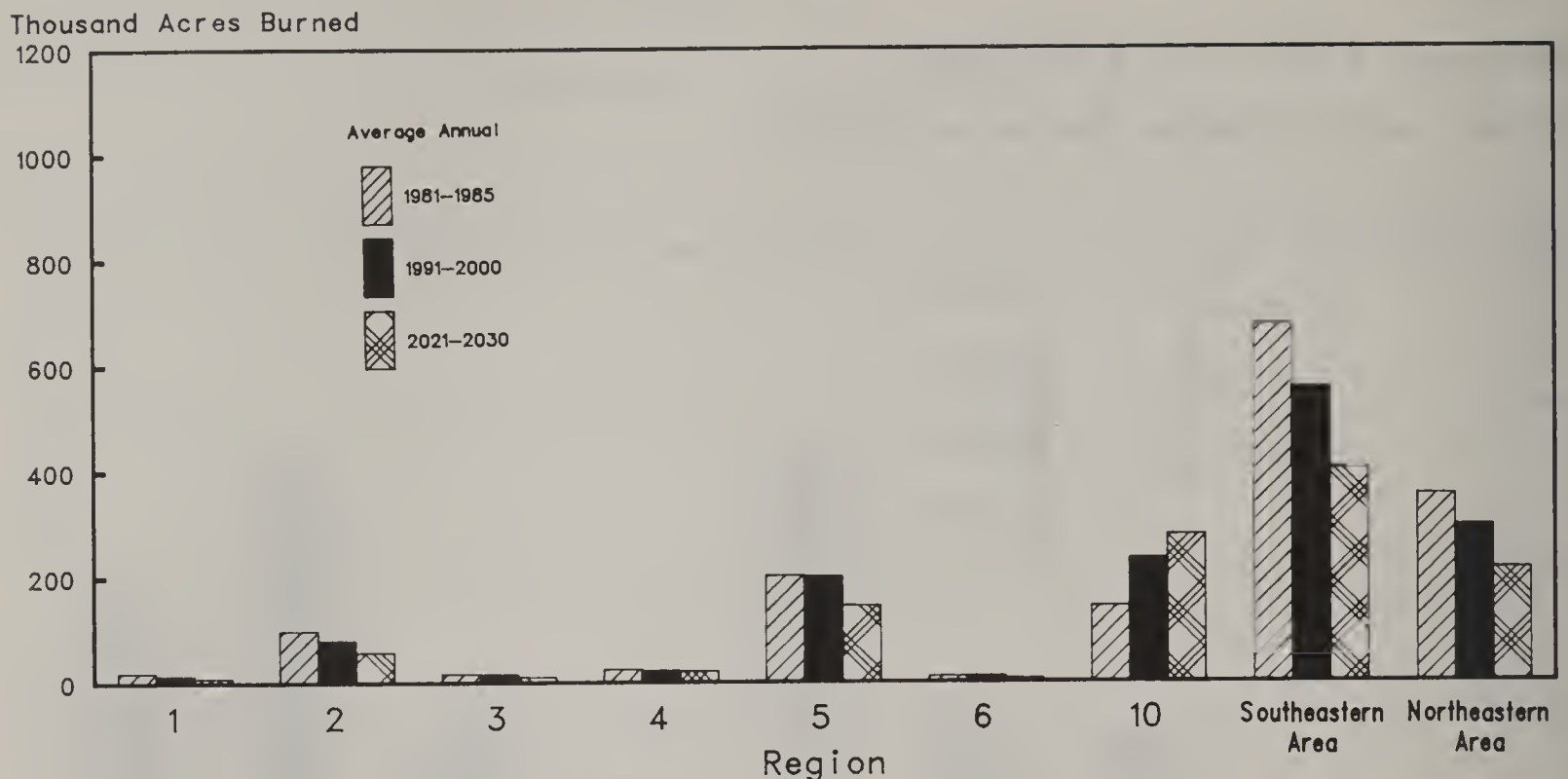
Figure 3.27

Regional Estimates-Alternative 1 **Rural Community Fire Protection (S&PF)**



Regional Estimates-Alternative 1

Fire Loss on Protected Area (S&PF)



practices designed to produce wood fiber and other forest products and values. Assistance provided for rural community fire protection is expressed in terms of approved applications in figure 3.27. Fire losses would be reduced in most parts of the country as illustrated in figure 3.28. In Alaska (Region 10), reported acreage burned is expected to continue to rise due to large increases in the area to be included under the State fire protection program without commensurate increases in program size.

Research.--Fire and atmospheric sciences research: The development of scientific knowledge and technology leading to fire management systems and strategies would provide cost-effective integrated systems for the prevention and control of fire. Information leading to the use of fire for protection and enhancement of resource outputs would also be strengthened. Overall, new skills and techniques would be developed through research to intensify total resource protection with special emphasis on fire management. This research would be directed toward both market and nonmarket commodities for the National Forest System and State and private forests.

Forest insects and disease research: Basic and applied research would be accelerated and intensified on methods to identify, assess, and predict the net social, economic, and environmental effects of insects and diseases, commensurate with the high level of market and nonmarket outputs. New and improved methods would be developed to evaluate and predict how, and to what degree, harmful agents affect all resource uses and values. Research would also strengthen understanding of important biotic and abiotic factors that influence pest populations. Completion of basic and applied research, and the development of new and improved insect and disease management systems would be expedited to support high-level market and nonmarket outputs. Integrated pest management strategies would be stressed. Methods and guidelines would be improved to evaluate benefits and costs of various treatment strategies. Pest management decisionmaking guidelines for land managers would be validated and published.

National Goals

Land management planning, NFS.--Substantially accelerate land and resource management planning and related special studies to a high level of reliability.

Land status, NFS.--Substantially accelerate land line location and marking, title claims, land status, land exchanges, and land acquisition to avoid boundary encroachments, facilitate intensified land management activities, and move toward most efficient landownership patterns for output of multiple resources. Facilitate early completion of Native and State land selections in Alaska.

Special land uses, NFS.--Substantially increase efforts to plan and provide for special land uses.

Cooperation in State forest resource planning, S&PF.--Substantially increase cooperation and technical assistance to States for forest resources planning.

Forest resources economics research.--Increase development and use of scientific knowledge needed to provide economic analyses of alternative systems of multiresource management and use on all forest and rangelands.

Renewable resources evaluation research.--Increase development and use of scientific knowledge to provide up-to-date inventories and analyses of all renewable resources on all forest and rangelands.

Outputs and Activities

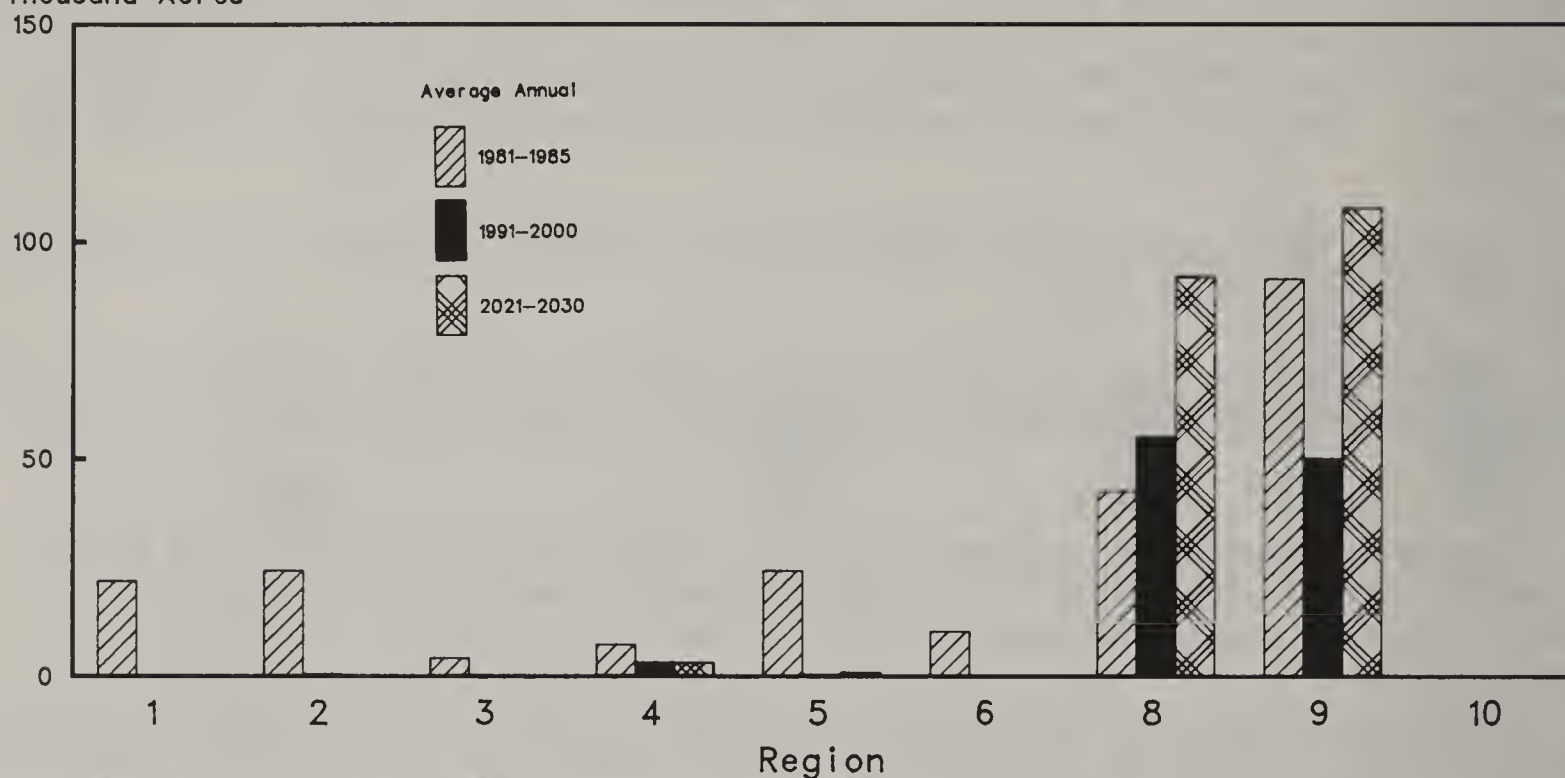
National Forest System.--Land and resource management plans would be completed for all National Forest System lands well ahead of the mandatory October 1985 completion date. Planning and special studies needed to ensure a high degree of reliability to support a high level of resource activity would be accelerated. Activity associated with a high level of resource output on National Forest and other intermingled lands would substantially increase the need for identifiable property lines and status of lands. Landline location and marking would be aggressively pursued on 270,000 miles of line and 620,000 property corners needed to facilitate high-level outputs of resources. Surveys to establish or re-establish lines would be expected to identify approximately 45,000 trespasses. Title claims would be increased as private owners' efforts to intensify use of their lands reveal title conflicts which must be resolved. Land purchases using land and Water Conservation funds would be at a high level until the program ends in 1989.

Land purchases with regular (Weeks Act) funds would acquire critically needed lands, and lands needed to improve manageability of eastern National Forests to near optimum levels by year 2020. Land acquisition and exchange in support of dispersed and developed site recreational opportunities would be maximized. Similar acquisition and exchange to protect and restore watersheds would also be increased (figure 3.29). Other land exchanges and adjustments would be at a moderate level to gain the efficiencies of improved landownership patterns.

Figure 3.29

Regional Estimates-Alternative 1 **Land Purchase and Acquisition (NFS)**

Thousand Acres

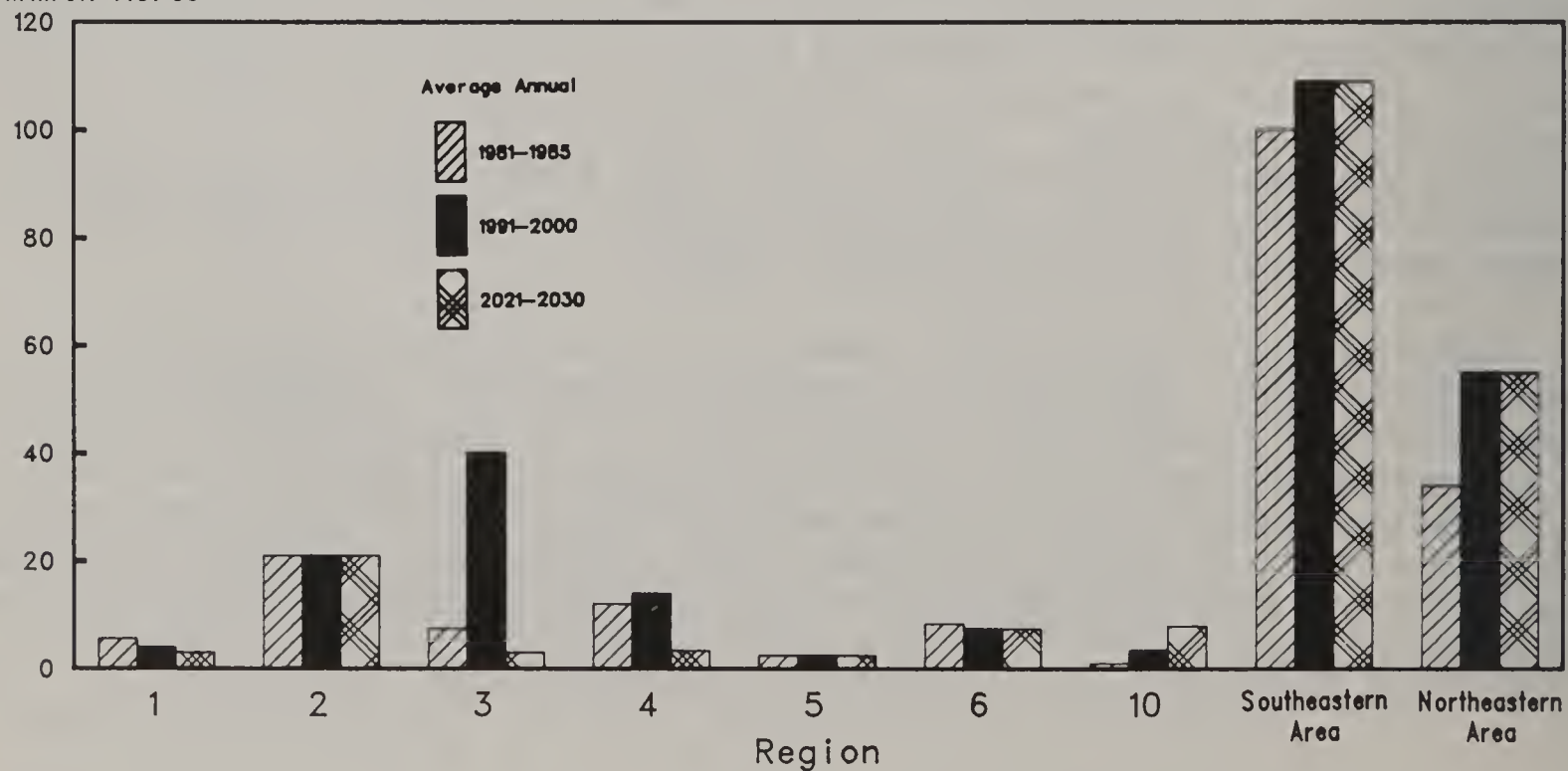


Includes Land and Water Conservation Fund Purchases
 Excludes Land Exchanges

Figure 3.30

Regional Estimates-Alternative 1 **State Forest Resource Planning (S&PF)**

Million Acres



Special uses are primarily externally imposed. Needs of others for such uses of National Forest System lands would increase as a result of the national economy increasing. Increased efforts would be made to plan for and fulfill reasonable requests for uses, and existing special uses would be managed to protect the public interest.

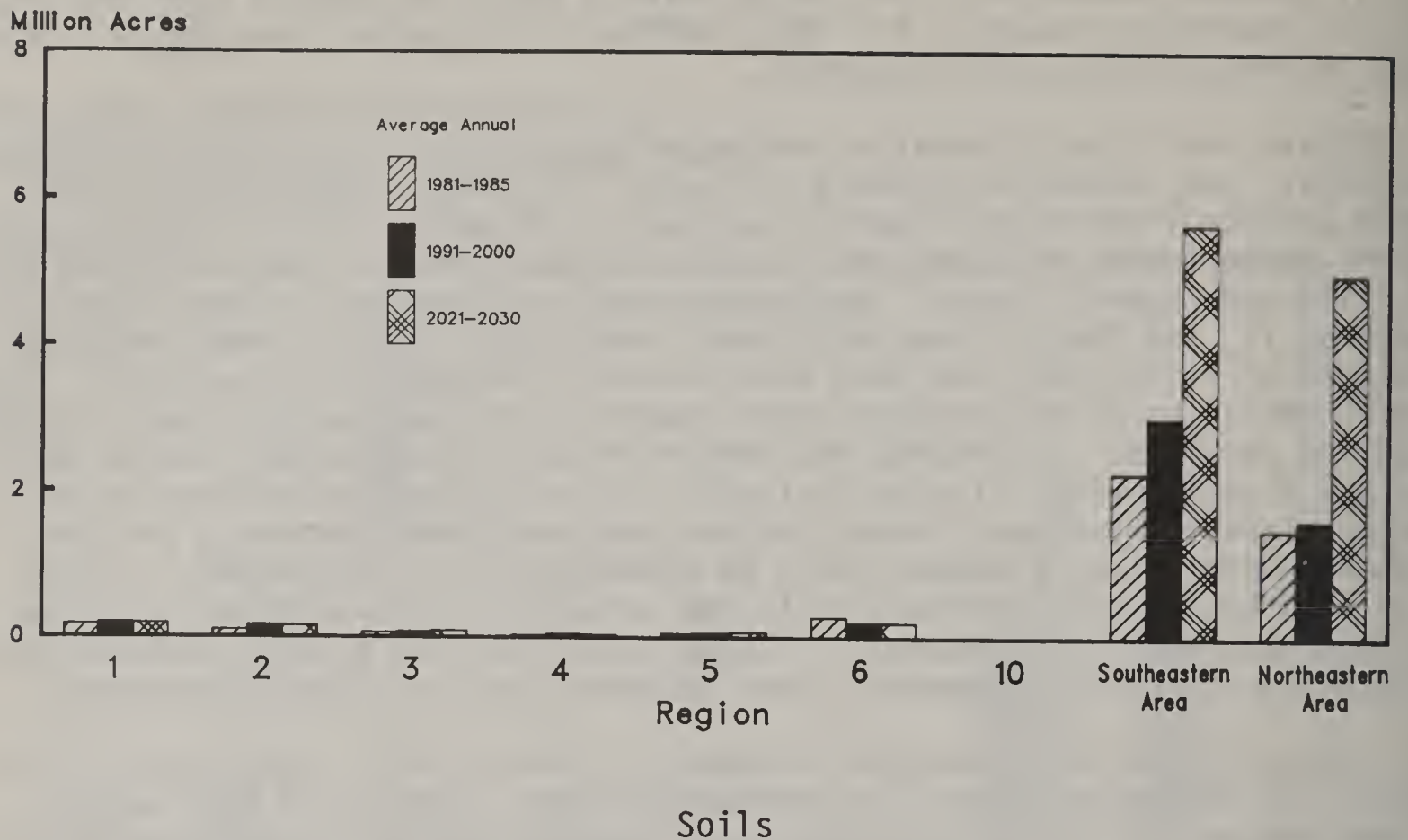
State and Private Forestry.--Substantial increases in Federal financial, technical, and related assistance to States for forest resources planning would provide significantly more incentive to assemble, analyze, display, and report State forest resource data, and train State forest resources planners at State and Federal levels. Assistance could be provided to most States requesting it, and funds to employ, train, and support State forest resources planners or to contract for such services would be generally available. State forest resources plans developed with Federal assistance would likely be thorough and detailed. Assistance for even more detailed sub-State forest resources planning would also be available. Coordination among State forest resource planners, National Forest System land management planners, and Resources Planning Act planners would be substantially strengthened. Figure 3.30 illustrates on a regional basis the acreage for which State forest resources plans would be prepared. Figure 3.31 shows the acreage included in multiresource forest management plans prepared for individual landowners.

Research.--Forest resources economics research would significantly increase the knowledge needed for improved economic analyses of land and resource management and use alternatives. Economic analysis techniques would be developed for all land managers to optimize output of all goods and services from all Federal, State, and private forest and range lands. Costs and benefits resulting from alternative land management practices would be determined for all forest types. The effects of public policies on the production of all renewable resources from public and private lands would be determined.

Renewable resources evaluation research would significantly improve techniques for integrated inventories of all forest and range resources. Research would significantly expand inventories and analyses of land, timber, forage, recreational resources, wildlife habitat and water, including evaluations of availability and use. Intensified inventories would improve the accuracy for more specific geographic areas and resource outputs. Inventories would be conducted at intervals necessary to provide up-to-date information for land and resource management planning.

Regional Estimates-Alternative 1

Landowner Forest Management Plans (S&PF)



National Goals

Technical soil support services, NFS.--Provide full range of technical soil services needed to maintain and improve soil productivity.

Soil resource improvement, NFS.--Intensively implement full range of soil resource improvements to enhance soil productivity.

Soil inventories, NFS.--Provide soil inventory data at an intensive level and increased rate.

Abandoned mineland reclamation, NFS.--Provide for high level reclamation efforts on lands where other resource values have been adversely impacted.

Technical assistance, S&PF.--Provide increased technical assistance and training in soil data interpretation for forest management purposes, in cooperation with the Soil Conservation Service.

Soil management research.--Increase development and use of scientific knowledge to provide necessary soil resources for recreation and wildlife habitats, intensive timber and range production, maintenance of natural ecosystems, and geological and other features of sites with scientific, educational, or scenic value.

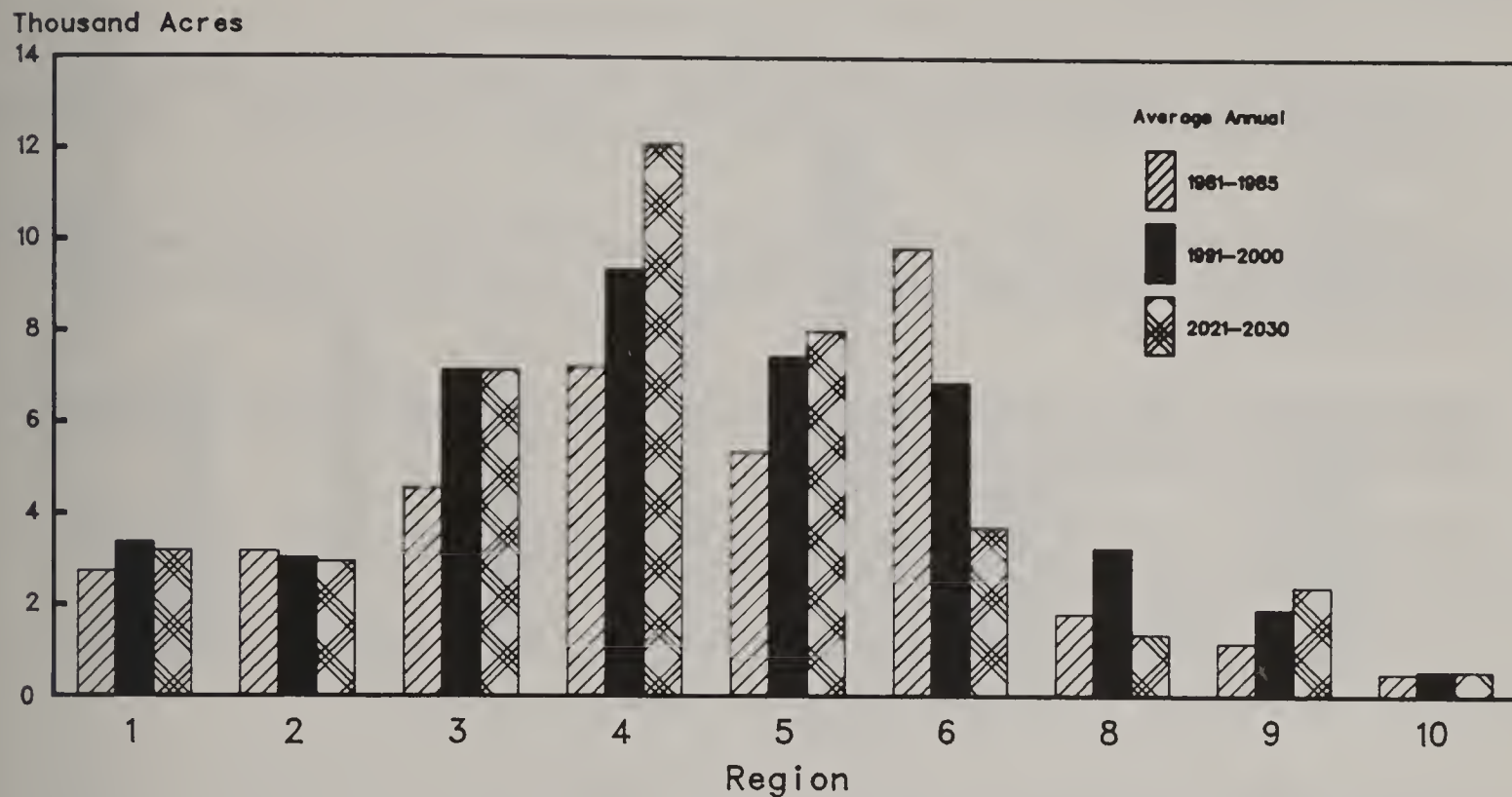
Outputs and Activities

National Forest System.--Soil activities in this element would exceed the support services required to maintain soil productivity and to provide for nondegradation of the soil resource due to other resource activities. The detail and quantity of soil inventories would increase as management intensified to produce high levels of outputs. Resource improvements to increase natural soil productivity to meet timber and range demands would be implemented (figure 3.32). Disturbed mined areas would be returned to planned productivity as soon as possible. Increased maintenance of soil resource improvement projects would maintain desired soil productivity.

Figure 3.32

Regional Estimates-Alternative 1

Soil and Water Quality Improvement (NFS)



State and Private Forestry.--Significantly more technical assistance and training in soil interpretations for forest management purposes would be available to State Foresters, or equivalent State officials, and through them, owners and managers of private forest lands. These interactions would include information on forest productivity, erosion hazard ratings, road location, and harvesting and site preparation techniques to protect the soil resource. The identification of prime forest land, based upon soil productivity and other characteristics, is essential to the development of State forest resources plans described in the Lands element on preceding pages. To emphasize this phase of forest resources planning, four field units (Southeastern and Northeastern Areas, Intermountain and Alaska Regions) would provide special cooperative technical assistance under the Soils element. Five field units (Northern, Rocky Mountain, Southwestern, Pacific Southwest, and Pacific Northwest Regions) would incorporate any assistance for prime forest land mapping within the State forest resources planning program in the lands element.

Research.--Research would determine the soil requirements for recreation sites and wildlife habitats. Techniques would be developed to reduce soil erosion to maintain terrestrial ecosystems, and improve streamflow water quality to maintain aquatic ecosystems. Soil properties limiting timber and forage production would be evaluated; soils with greatest potential for increased productivity identified; and techniques developed to improve productivity by fertilization, drainage, etc. Soil resources necessary for maintenance of ecological, scientific, and educational sites would be evaluated.

National Goals

Utility systems, NFS.--Accelerate restoration and installation of all utility systems to meet current environmental standards and delivery volumes required to support intensive resource management. Search out and implement new methods of delivery.

Building construction, NFS.--Accelerate construction of buildings to support intensive management, health and safety, equal opportunity, and energy conservation.

Building maintenance, NFS.--Accelerate rehabilitation and maintenance of buildings to current health and safety standards. Continue conversion for energy conservation.

Communications, NFS.--Accelerate installation of communications systems with technologically advanced equipment.

Transportation, including road and trail construction, NFS.--Complete principal transportation network by 2000.

Water impoundments, NFS.--Accelerate upgrading and development of water impoundments to support increased multiple resource benefits.

Research construction.--Accelerate construction and maintenance of research laboratories and related facilities for an intensive research effort, health and safety, and equal opportunity. Continue conversions for energy conservation.

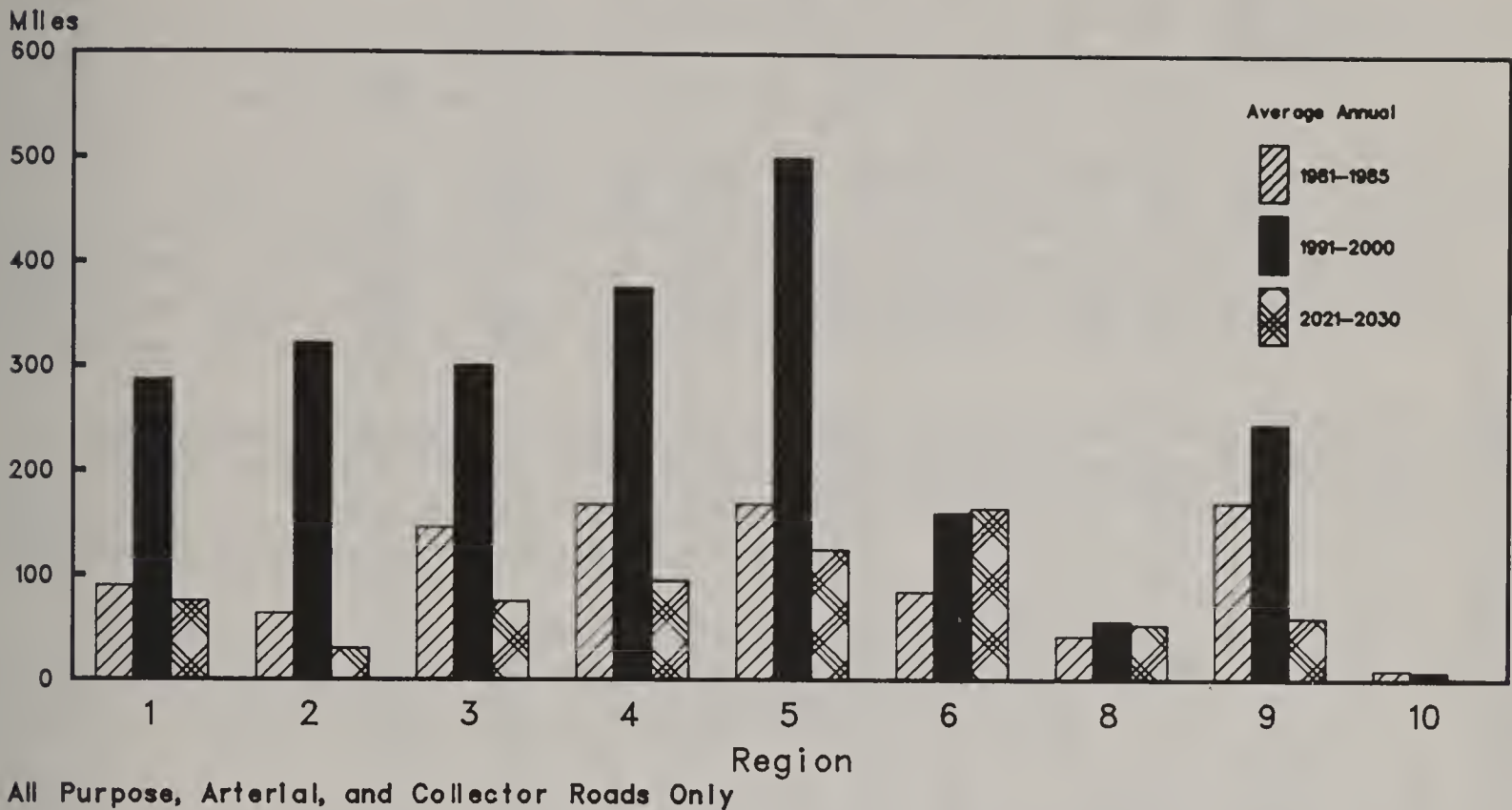
Outputs and Activities

National Forest System.--Develop capital-intensive programs to invest in, operate, and maintain facilities to maximize protection, use, and development opportunities of all resources through a new and improved physical plant. Support all management systems with more efficient and effective facilities. The existing physical plant, comprised of buildings, utility systems, dams, and transportation systems emerged during the last 70 years. Repair, replacement, and additions to the physical plant would be essential to an expanded resource program. Specific areas of interest and emphasis would include the Rocky Mountains and Appalachia. In addition, all areas identified as roadless, and classified as available for development, would be analyzed for major access and management systems needs. Facility installation and maintenance programs would be implemented to provide full capabilities to these areas. Figure 3.33 displays the work to be accomplished by Regions to complete their individual principal transportation systems by the year 2000. Other roads to be constructed for specific resource activities are contained in the individual program element outputs, activities and cost figures.

Research.--Accelerated construction and maintenance of research laboratories and related facilities would support the proposed intensive research efforts, health and safety, equal opportunity, and energy conservation programs.

Figure 3.33

Regional Estimates-Alternative 1 Road Construction/Reconstruction (NFS)



Environmental Effects

The environmental effects of this Alternative--physical-biological, economic, and social--are summarized on the following pages. For a more detailed description of these effects, see chapter 4.

Physical-Biological Effects

Under Alternative 1, water quality goals would be met and yield would be at a maximum. Air quality would be reduced in the short term, but increase in the long term, as a result of reductions in emission. Visual quality would be severely impacted in the short term as a result of changes in color and texture, but moderately impacted in the long term. Most of the endangered and threatened species populations would be benefited, while a few would be maintained. Two would be adversely affected. Most species other than endangered and threatened would be benefited, although a number associated with climax forests and riparian vegetation would be adversely affected. The cultural resource would be impacted most under this Alternative but opportunities for development and enhancement would also be high. Impacts would greatly exceed the current level resulting in extensive mitigation action.

Economic Effects

The present net worth for the total National Forest System Alternative 1 over 50 years is \$45.8 billion discounted at 7-1/8 percent (table 3.4).

Table 3.4.--NFS present net worth for Alternative 1
discounted at 7-1/8 percent by resource element & region

(Million dollars)

ELEMENT	NFS REGIONS										TOTAL BY ELEMENT
	1	2	3	4	5	6	8	9	10		
Recreation	94	1,056	375	790	2,607	557	1,480	672	226	7,857	
Wilderness	126	505	66	252	560	90	8	245	-6	1,846	
Wildlife & Fish	274	791	418	511	168	490	325	206	305	3,488	
Range	41	38	-58	-122	-34	-13	-13	-15	--	-176	
Timber	-315	-657	-97	-291	3,588	14,595	569	-675	-635	16,082	
Water	4,151	1,262	62	1,651	1,035	1,514	230	27	1,339	11,271	
Minerals 1/	574	1,582	702	1,431	5	-74	137	429	601	5,386	
Total by Region	4,943	4,576	1,468	4,222	7,929	17,159	2,736	889	1,830	45,754	

1/ Value for locatable materials other than uranium and thorium was not determined. This primarily impacts the values in Region 5.

Timber and water provide the largest net benefits. Together these resource elements account for over 60 percent of total present net worth. Other resource elements with large positive values are recreation, minerals, wildlife and fish. Only range has a negative value and this is minor. The negative value is due to investment costs necessary to support significant increases in grazing use.

Alternative 1 yields a positive present net worth for each Region. The Pacific Coast Regions (Regions 6 and 5) contribute over 55 percent of the present net worth (38 percent and 17 percent, respectively).

All Regions have positive values for water, recreation, and wildlife and fish. Regions making significant contributions towards the total value of each element include Region 1 of the Rocky Mountains contributing over 37 percent of water value, and the Pacific Southwest Region (Region 5) contributing over 33 percent of the recreation value.

The timber element in the Pacific Coast Regions (Regions 5 and 6) makes the largest contribution toward the national present net worth values. Regions 1, 2, 3, and 4 of the Rocky Mountains, the Northern Region (Region 9), and Alaska (Region 10) have negative values.

For minerals, the southern portion of the Rocky Mountains (Regions 2, 3, and 4) contributes over 69 percent of the present net worth (29, 13, and 27 percent, respectively) due to energy-related minerals.

Returns to Government.--Returns to government from gross sale (or lease) of National Forest resources for Alternative 1 are expected to be \$1,728 million in 1981, \$2,326 million in 1985, \$3,102 million in 1995, and \$7,014 million in 2025.

These returns include cash payments, required deposits from purchasers to finance activities resulting from timber sales, (such as Knutson-Vandenberg deposits), and credits allowed for work performed by the purchasers.

The Alternative 1 annual revenue is derived as follows:

(Million dollars)				
Activity	1981	1985	1995	2025
Recreation	16	19	24	33
Grazing	24	19	24	30
Timber	1,522	1,964	2,471	5,621
Minerals, NFF <u>1/</u>	23	40	65	101
Total NFF <u>2/</u>	1,585	2,042	2,584	5,785
Minerals, BLM <u>3/</u>	<u>143</u>	<u>285</u>	<u>518</u>	<u>1,229</u>
Total Government	1,728	2,327	3,102	7,014

1/ (NFF) National Forest Fund.

2/ Historically, approximately 25 percent of the National Forest receipts have been paid to States for redistribution to local county governments. Payments are also made by BLM. These payments are in lieu of taxes.

3/ Mineral royalties collected from public domain National Forest System lands and reported by Bureau of Land Management.

Social Effects

The effects of Alternative 1 on the existing social structure would be significant. Nationally, the magnitude would not be large. The greatest effects would be in regional and local nonmetropolitan areas that are dependent on Forest Service program outputs and services. These include large areas of the West and South and some areas in the North. The key social variables most affected would be population, community economies, housing, and opportunities for leisure activities. Opportunities for minorities, especially native Americans and urban Blacks, would increase in several of these areas. Increased outside influences would affect community identity and probably alter local cultures and lifestyles. Effects of the Alternative would be especially significant in the West and Southwest where they would interact with prevailing rapid growth and change.

On a national scale this Alternative was ranked in the middle for "futures foregone". That is, two Alternatives were less desirable while two were more desirable.

In "conflict polarization," this Alternative was ranked least desirable of the five original Alternatives. (See chapter 4 for definitions.)

ALTERNATIVE PROGRAM DIRECTION 2

(Forest Service programs would provide low-level market and nonmarket outputs on National Forests, and State and private forest and rangelands.)

For Alternative 2, the emphasis would be on protection, conservation, and rehabilitation of air, land, and water resources within forest and range lands. Outputs, both market and nonmarket, would be deemphasized.

This Alternative provides a base management level of forest and range lands. It represents the minimum program, below which the Forest Service could not meet legal responsibilities.

Program in Brief

National Forests

National Forest lands are managed, with certain exceptions, according to multiple use and sustained yield. This concept is designed to make optimum use of land and to assure a continuous flow of all goods and services. Inherent in this concept is the Forest Service charge to protect and to preserve the physical environment and to serve as a good steward of the land. It is this aspect of the multiple use and sustained yield principle that guides program development and implementation for Alternative 2. The emphasis on all use of these National Forest lands would be to minimize adverse impacts on the land, to protect and conserve the existing resources, and to rehabilitate these resources where deterioration has occurred.

State and Private Forestry

A significant reduction in outputs from the National Forests would increase pressures on State and private forest lands to meet demands for goods and services. However, many cooperative forestry assistance programs would be reduced or eliminated under this Alternative. Outputs from State and private forests attributable to Federal assistance would be much smaller than those projected in the 1975 Recommended Program or those under any other Alternative. Increased investments on State and private forest lands would result from State, local, and private initiatives rather than from federally supported incentives or other assistance. This reduced Federal role would emphasize technical rather than financial assistance to State forestry agencies.

Research

Research efforts would be oriented toward studies which would provide information on the judicious protection and use of resources.

Human Resource Development

Human and community development would continue to be a goal in selected Forest Service programs. Under Alternative 2, use of cooperative work force programs would be directed toward the protection, conservation, and restoration efforts conducted on National Forest System lands.

Summary of Program Outputs, Activities, and Costs

Under Alternative 2, National Forest System recreation opportunities would drop below present levels, emphasizing protection of resource values. Recreation use would gradually decline from 210 million visitor days in 1978 to 173 million in 2025, excluding wilderness use. Cooperative assistance would be given on request to owners who include dispersed recreation and esthetic improvements in multiresource forest management plans for their lands.

Wilderness designation for the National Forest System would be recommended for only the most outstanding areas of potential wilderness. Wilderness management would be limited to the minimum necessary to protect and perpetuate the wilderness resource.

On the National Forest System, wildlife habitat improvements would decline from 2.3 million acre-equivalents in 1978 to 0.3 million in 2025. Anadromous fish habitat improvements would increase the contribution of the National Forests to the commercial salmon fishery by 2.6 million pounds by 1988 and level off through 2025. A low level of cooperative assistance for wildlife and fish habitat improvement on private lands would be provided, primarily through preparing multiresource forest management plans for landowners wanting to emphasize wildlife.

Livestock grazing on the National Forest System would decrease from the present 9.9 million animal unit months to approximately 6.2 million in 2025. Cooperative assistance for forage production on non-Federal forested range would be minimized, and would consist primarily of incorporating range objectives, where appropriate, into multiresource forest management plans.

National Grassland management would make maximum use of the Federal land to demonstrate sound and practical principles of land use and to exert a favorable influence for securing sound land conservation practices on associated private lands, to help assure the private lands meet demands for goods and services. Selected areas of National Forest lands also would be managed to demonstrate effective management to owners of similar private tracts.

National Forest System timber sale offerings would decrease from 12.2 billion board feet in 1978 to 8.2 billion in 2025. Annual reforestation in the System would be limited to 226,000 acres in 1995 on regeneration-harvested lands and catastrophically deforested lands that are currently accessible, and that are not expected to regenerate naturally within 5 years. Reducing National Forest System timber offerings would provide economic incentives for increasing production on State and private lands, but this Alternative would also reduce cooperative assistance programs below current levels. Assistance would focus on proper sale, harvest, and processing techniques rather than timber growth.

Water yield on the National Forest System would not change and the percentage of water exceeding water quality goals would increase slightly. Cooperative assistance for protecting and improving the quality, quantity, and timing of water yields from non-Federal forest lands would be given only on a limited basis in high-value areas.

Although this Alternative recognizes that mineral demand will rise, the processing of minerals proposals for the National Forest System lands could not be expedited. In general, efforts would be limited to those necessary to comply with NEPA and reclamation laws and regulations. This Alternative would permit handling an estimated 14,734 cases in 1981, increasing to 20,100 by 2025. Cooperative assistance for mined land reclamation on non-Federal lands would be minimal.

Research would emphasize production of only the knowledge and technology needed to protect all resources on both public and private range lands.

This Alternative emphasizes labor-intensive programs and would moderately increase Human and Community Development programs on the National Forest System. Cooperative assistance to States and cities for urban and community forestry would be discontinued.

The total Forest Service work force, in thousand person-years, necessary to perform the work included in this Alternative program is as follows:

Base Year						1986-	1991-	2001-	2011-	2021-
1978	1981	1982	1983	1984	1985	1990	2000	2010	2020	2030
44.4	53.6	53.3	53.5	52.8	52.3	43.6	38.5	36.8	35.5	35.1

Table 3.5 displays a national summary of National Forest System projected program outputs, activities, costs, and returns to the Government for Alternative 2. Table 3.6 shows comparable data for State and Private Forestry programs. Table 3.7 summarizes the Research program. Costs by program area for Alternative 2 are shown in figure 3.34.

Table 3.5--Projected National Forest System program outputs, activities, and costs ^{1/}

Alternative 2

PROGRAM ELEMENT AND OUTPUT/ACTIVITY	UNIT OF MEASURE	BASE YEAR 1978	ANNUAL UNITS									
			1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
RECREATION												
Developed Recreation Use (Includes VIS)	Million Recreation Visitor Days	79.6	78.1	77.9	79.6	79.0	77.8	73.4	69.4	66.4	64.3	63.0
Dispersed Recreation Use (Includes Wild- life & Fish)	Million Recreation Visitor Days	130.2	119.5	120.2	117.7	116.6	115.7	114.0	112.2	111.4	111.0	110.5
Trail Construction/ Reconstruction	Miles	600	600	500	500	500	500	400	400	400	400	400
WILDERNESS												
Wilderness Management	Million Acres	15.3	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
WILDLIFE & FISH												
Wildlife Habitat Improvement	Thousand Acre- Equivalents	2330	1450	1330	1300	1260	1190	267	266	265	264	262
Anadromous Fish Improvement	Thousand Pounds	--	1	42	138	480	1300	2600	2600	2600	2600	2600
RANGE												
Grazing Use (Live- stock)	Million Animal- Unit Months	9.9	9.8	9.8	9.6	9.5	9.4	9.0	8.5	7.7	6.9	6.2
TIMBER												
Programmed Sales Offered	Billion Board Feet	12.2	10.4	9.9	9.8	9.6	9.5	9.5	9.4	9.2	8.6	8.2
Reforestation	Thousand Acres	411	364	370	369	365	357	236	226	218	211	206
Timber Stand Improvement	Thousand Acres	420	274	287	265	247	229	74	27	21	21	21
WATER												
Volume Meeting Water Quality Goals	Million Acre Feet	--	337	403	404	406	407	411	416	421	421	421
MINERALS												
Minerals Leases and Permits	Thousand Operating Plans	14.5	14.7	14.3	14.8	15.4	15.9	16.4	17.2	18.1	19.6	20.1
HUMAN & COMMUNITY DEVELOPMENT												
Human Resources Programs 2/	Thousand Enrollee Years	14.8	16.7	14.0	14.0	14.0	14.0	0.6	0.6	0.6	0.6	0.6
PROTECTION												
Fire Management Effectiveness Index	Dollars/ Thousand Acres	1110	1610	1550	1560	1570	1570	1560	1530	1520	1510	1510
Fuelbreaks & Fuel Treatment	Thousand Acres	392	110	161	162	161	160	163	153	150	150	150
LANDS												
Land Purchase and Acquisition (Excludes Exchange)	Thousand Acres	117	203	186	182	175	169	297	24	24	23	23
SOILS												
Soil & Water Resource Improvement (Improved Watershed Condition)	Thousand Acres		11.0	12.3	12.5	12.4	12.8	18.3	17.0	10.0	7.1	6.9
FACILITIES												
Road Construction/ Reconstruction (Arterial, Collector)	Miles	690	140	310	340	350	310	290	270	270	270	250
RETURNS TO THE GOVERNMENT	Million Dollars		962	966	1036	1100	1168	1162	1498	1850	2288	2744
COSTS												
NATIONAL FOREST SYSTEM-												
Operational	Million Dollars	676 ^{3/}	658	761	773	771	776	777	762	752	730	718
Capital Investments ^{4/}	Million Dollars	684	664	555	554	536	527	330	439	408	387	384
Backlog ^{5/}	Million Dollars	61	30	27	27	26	18	17	17	--	--	--
Total Appropriated ^{6/}	Million Dollars	1421	1352	1343	1354	1333	1321	1124	1218	1160	1117	1102
Allocated Funds ^{7/}	Million Dollars	244	369	369	369	369	368	270	4	4	4	4
Total NFS	Million Dollars	1665	1721	1712	1723	1702	1689	1394	1222	1164	1121	1106

^{1/} All costs and returns are shown in constant 1978 dollars.

^{2/} Human Resource Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

^{3/} The 1978 base year figure has been adjusted upward in order to include the effect of the revised fire financing policy which calls for full funding of presuppression activities instead of relying on supplemental appropriations. The amount of the adjustment (92.4) is from the 1979 President's Budget.

^{4/} NFS capital investments are such things as: sale preparation--live volume; TSI/reforestation; range structural improvements; road and trail construction/reconstruction; wildlife and fish habitat improvement; developed recreation site construction; water and soil resource improvements; and fuel treatments.

^{5/} Backlog costs are shown here for information only and are included in capital investment costs.

^{6/} Total appropriated costs are the sum of operational and capital investment costs. NFS appropriated funds include all YCC and Cooperator funds.

^{7/} NFS allocated costs include YACC and other human resource programs, O&C Grants, Land and Water Conservation, and other funds. Costs exclude payments to States and Counties, and Federal Highway Funds.

Abbreviations used: AUM = animal unit month; RVD = recreation visitor day.

Table 3.6--Projected State & Private Forestry program outputs, activities,
and costs 1/

Alternative 2

PROGRAM ELEMENT AND OUTPUT/ACTIVITY	UNIT OF MEASURE	BASE YEAR 1978	ANNUAL UNITS									
			1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
RECREATION												
Technical Assistance for Dispersed Recreation	Thousand Acres	81	109	109	110	110	112	113	116	116	115	117
WILDLIFE & FISH												
Technical Assistance for Wildlife Habitat Improvement	Thousand Acres	170	117	117	118	118	118	115	108	113	116	116
RANGE												
Technical Assistance for Range Improvement	Thousand Acres	50	67	67	67	66	72	72	77	81	84	84
TIMBER												
Reforestation (RFA, FIP, ACP).	Thousand Acres	326	389	368	342	310	273	266	251	247	248	248
Timber Stand Improve- ment (RFA, FIP, ACP)	Thousand Acres	275	347	348	344	344	340	330	314	311	311	312
Timber Prepared for Harvest	Million Cubic Feet (MMCF)	225	237	235	234	232	231	222	203	201	201	201
Woodland Owners Assisted	Thousand Owners	165	185	184	183	183	182	177	165	165	165	165
Improved Wood Utilization	Million Cubic Feet (MMCF)	164	128	126	117	113	109	106	105	106	106	107
HUMAN AND COMMUNITY DEVELOPMENT												
Urban and Community Forestry	Thousand Urban Areas	7.0	--	--	--	--	--	--	--	--	--	--
PROTECTION												
Insect and Disease Surveys	Million Acres	600	370	348	329	297	295	295	295	295	295	295
Rural Community Fire Protection	Thousand Approved Applications	3.0	--	--	--	--	--	--	--	--	--	--
Fire Loss on Pro- tected Area	Thousand Acres Burned	1700 2/	--	--	--	--	--	--	--	--	--	--
WATER, MINERALS, LANDS, AND SOILS												
State Forest Resource Planning	Million Acres	--	62	47	101	49	51	53	36	53	53	53
Landowner Forest Management Plans	Million Acres	3.2	2.8	2.9	2.9	2.9	2.9	2.8	2.8	2.6	2.6	2.6
Cooperative Technical Assistance	Person Years	--	22	22	24	24	24	27	31	28	30	30
COSTS												
STATE AND PRIVATE FORESTRY-												
Operational	Million Dollars	30	12	12	12	12	12	12	12	12	12	11
Capital Investments 3/	Million Dollars	50	22	22	22	22	22	21	21	21	21	22
Total Appropriated 4/	Million Dollars	80	34	34	34	34	34	33	33	33	33	33
Allocated 5/	Million Dollars	37	29	25	25	25	25	22	22	18	18	18
Total S&PF	Million Dollars	117	63	59	59	59	59	55	55	51	51	51

1/ All costs are shown in constant 1978 dollars.

2/ S&PF-Cooperative fire loss base figure is calendar year 1977.

3/ S&PF capital investments include such activities as: reforestation; timber stand improvement; preparation of landowner forest management plans; cooperative forest resource planning; insect and disease surveys; and fire management planning and fuel treatment.

4/ Projected estimates of funds appropriated to the Forest Service for cooperative forestry assistance under P.L. 95-313.

5/ Projected estimates of funds appropriated to other USDA agencies for programs which receive assistance from the Forest Service and State forestry agencies, including (1) forestry practices under the Agriculture Conservation Program and the Forestry Incentives Program funded through the Agricultural Stabilization and Conservation Service; (2) Rural community fire protection funded through the Farmers Home Administration; and (3) funds allocated to the Forest Service by the Soil Conservation Service for the forestry aspects of watershed planning, flood prevention, river basin surveys and investigations, and resource conservation and development.

Table 3.7--Planned Research program activities and costs

Alternative 2

FOREST RECREATION RESEARCH	Limited increase in ability to plan and manage recreation resources.											
WILDERNESS RESEARCH	Limited increases in knowledge of management and protection of most valuable ecological features.											
WILDLIFE, FISH, AND PLANT HABITAT RESEARCH	New knowledge of threatened and endangered species and their habitats.											
RANGE RESEARCH	Increases in knowledge of selected range ecosystems for livestock production.											
TIMBER MANAGERMENT RESEARCH	Knowledge to support extensive timber culture on best sites, consistent with production strategy.											
FOREST PRODUCTS UTILIZATION RESEARCH	Increased knowledge on hardwood utilization and protection and maintenance of the forest resource.											
FOREST ENGINEERING RESEARCH	Increased knowledge of harvesting wood for energy.											
WATER RESOURCE RESEARCH	Limit knowledge to maintain on-site water quantity and quality and eliminate discharge of pollutants.											
SURFACE ENVIRONMENT AND MINING (SEAM) RESEARCH	Sufficient increments of knowledge to maintain mine area streamflow quality.											
URBAN AND COMMUNITY FORESTRY RESEARCH	Limited increases in knowledge to assess urban forest benefits. Maintain, utilize, and protect urban forest.											
FIRE AND ATMOSPHERIC SCIENCES RESEARCH	Limited increases in knowledge of fire effects and air quality.											
FOREST INSECT AND DISEASE RESEARCH	Limit increases in knowledge of pest impacts on forest resources and insect and disease management systems.											
RENEWABLE RESOURCES ECONOMIC RESEARCH	Utilization of existing knowledge to provide economic analyses for minimum level of multiresource management.											
RENEWABLE RESOURCES EVALUATION RESEARCH	Inventory and analyses of timber provided at current cycles, information on other resources for broad planning purposes.											
SOIL MANAGEMENT RESEARCH	Increases in knowledge limited to protection and maintenance of soil productivity and watershed conditions.											
		BASE YEAR	AVERAGE ANNUAL COSTS									
	1970	1978	1981	1982	1983	1984	1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
COSTS RESEARCH-												
Operational <u>1/</u>		105.8	3/105.0	104.0	103.1	102.1	101.1	97.6	94.5	92.2	89.9	88.0
Capital Investments <u>2/</u>		2.7										
Total Research	76.4	108.5	105 0	104.0	103.1	102.1	101.1	97.6	94.5	02.2	89.9	88.0

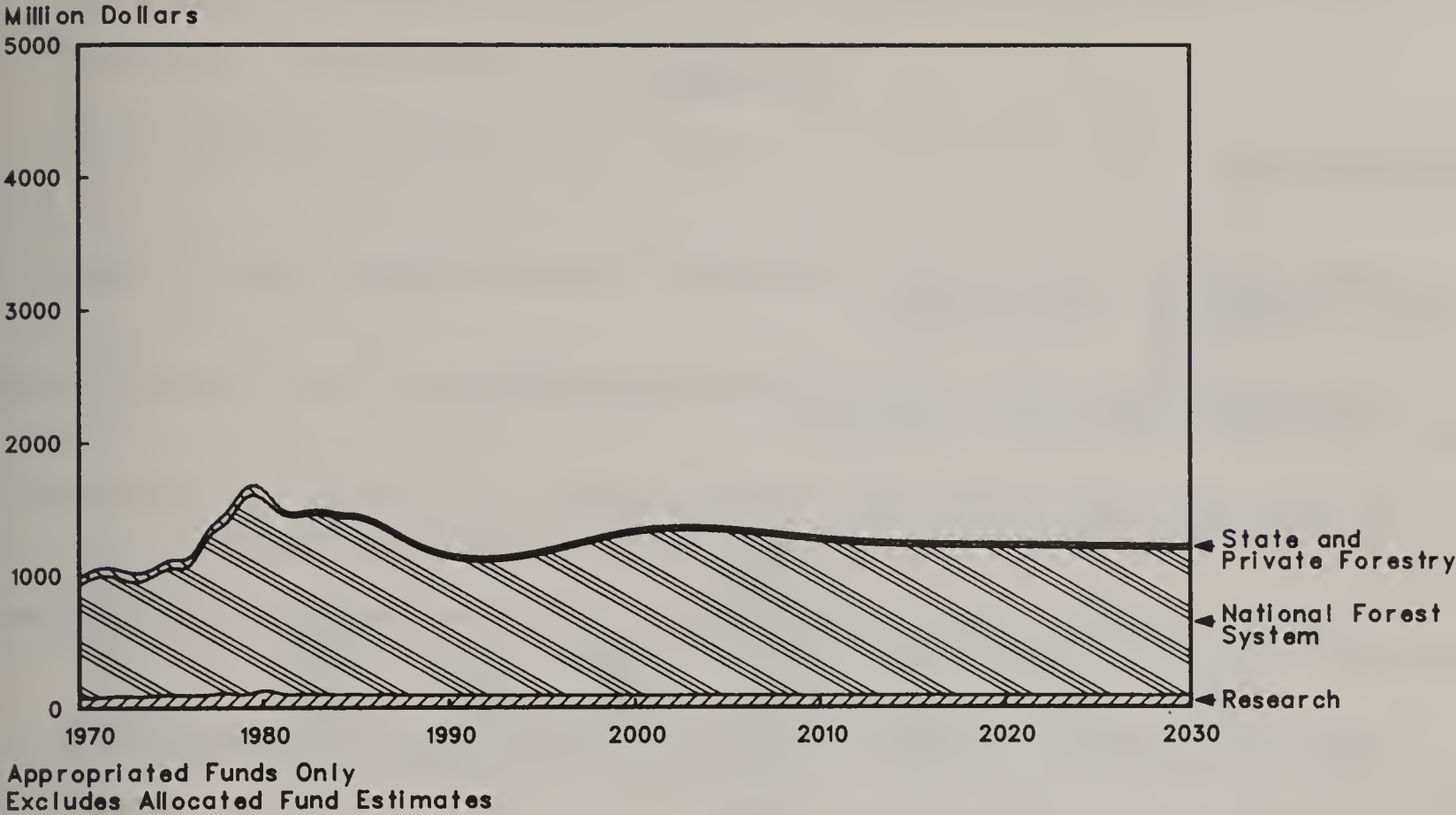
1/ Research program costs only. YCC, YACC, and other Human Resource Programs are included with NFS.

2/ Research construction.

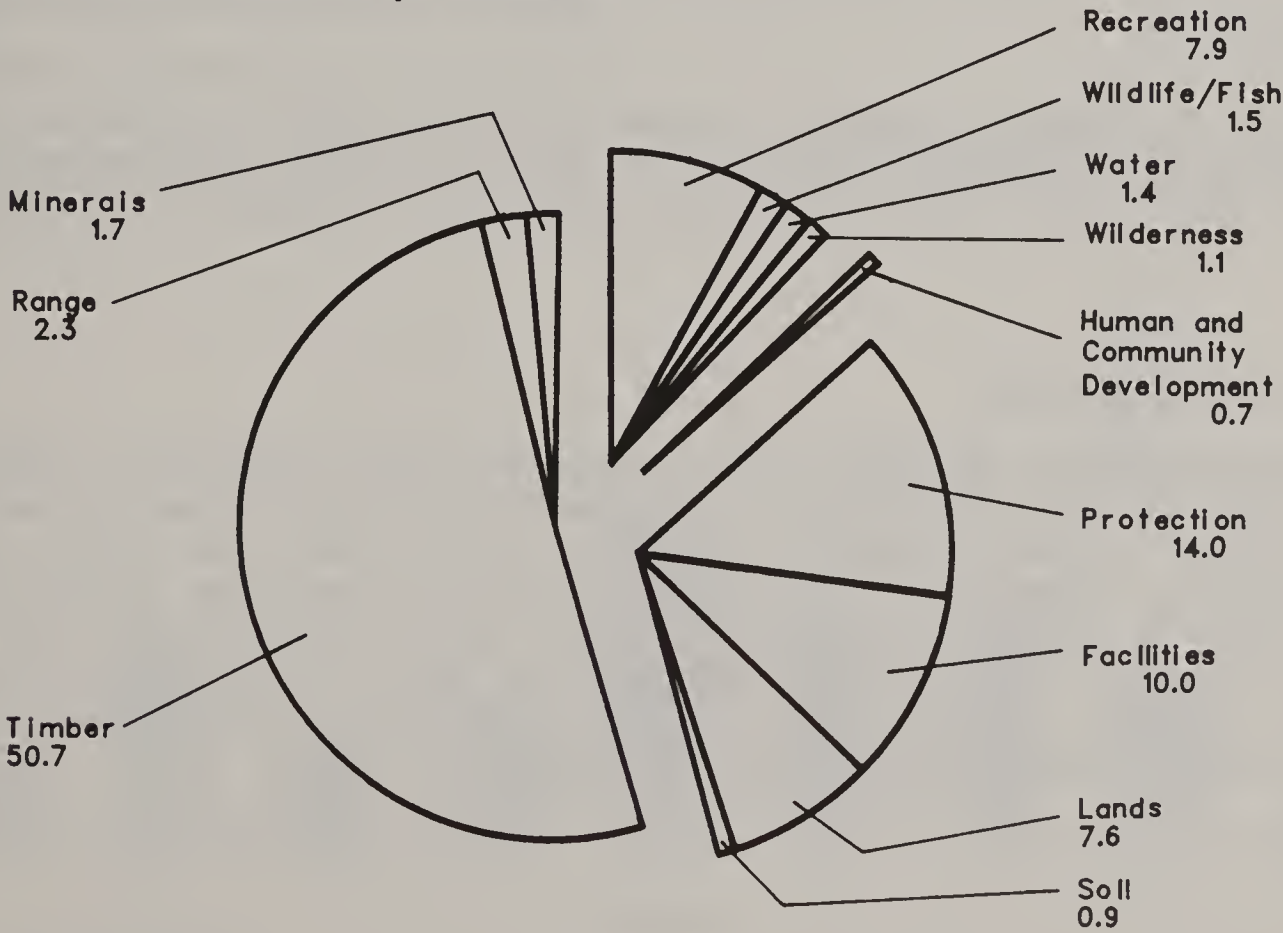
3/ All costs are in 1978 dollars.

Figure 3.34

Program Cost-Alternative 2



Alternative 2 Percent of Total Cost by Element 1991 - 2000



THE DETAILS

This section contains additional narrative and graphic material on goals, outputs, and activities for each element in Alternative 2. The last part of the section summarizes environmental effects of the Alternative.

Recreation

National Goals

General, NFS.--Provide for a decreased relative national share of use and outdoor recreation opportunities.

Developed sites, NFS.--Maintain existing developments sufficiently to protect forest and range land resources.

Dispersed recreation use, NFS.--Direct outdoor recreation use and activities to lands that require minimum administration and protection.

Private investment, NFS.--Provide for private investment in and development of outdoor recreation opportunities on NFS lands.

Visitor Information Service (VIS), Visual and Cultural Resource Management, NFS.--Provide orientation and interpretive services only at existing visitor centers near urban areas. Stress environmental protection. Protect visual and cultural resource values.

Cooperation with others, S&PF.--Participate in cooperative planning and provide technical assistance in support of outdoor recreation only as part of a request for multipurpose forest management assistance on other public and private lands. Private owners desiring technical assistance for income-producing projects would be referred to the Soil Conservation Service or to consultants.

Forest recreation research.--Conduct limited effort to increase development and use of scientific knowledge to improve methods of planning and managing recreation and visual resources, and improve methods of managing visitor use.

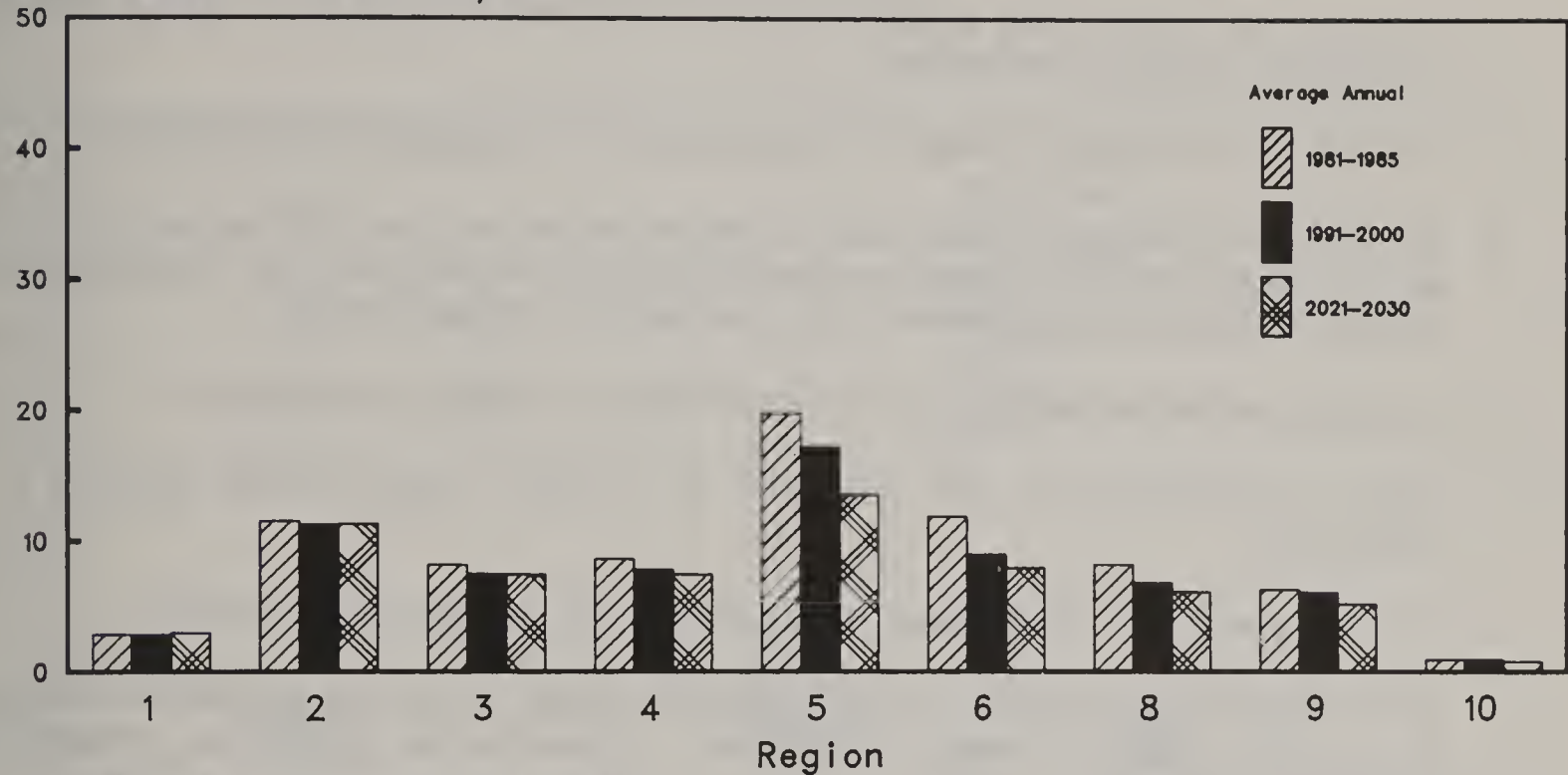
Outputs and Activities

National Forest System.--This Alternative would reduce the supply of recreation opportunities below what is currently available from the National Forest System. Emphasis would be on protection of resource values. Recreation use (excluding wilderness) would gradually decline from the present 210 million visitor days in 1978 to 173 million visitor days in 2025 (table 3.5). As depicted in figures 3.35 and 3.36, this decline in use would occur rather equally among all Regions. Interpretation, enhancement, and protection of cultural resources would be maintained at current levels.

Figure 3.35

Regional Estimates-Alternative 2 Developed Recreation Use (NFS)

Million Recreation Visitor Days

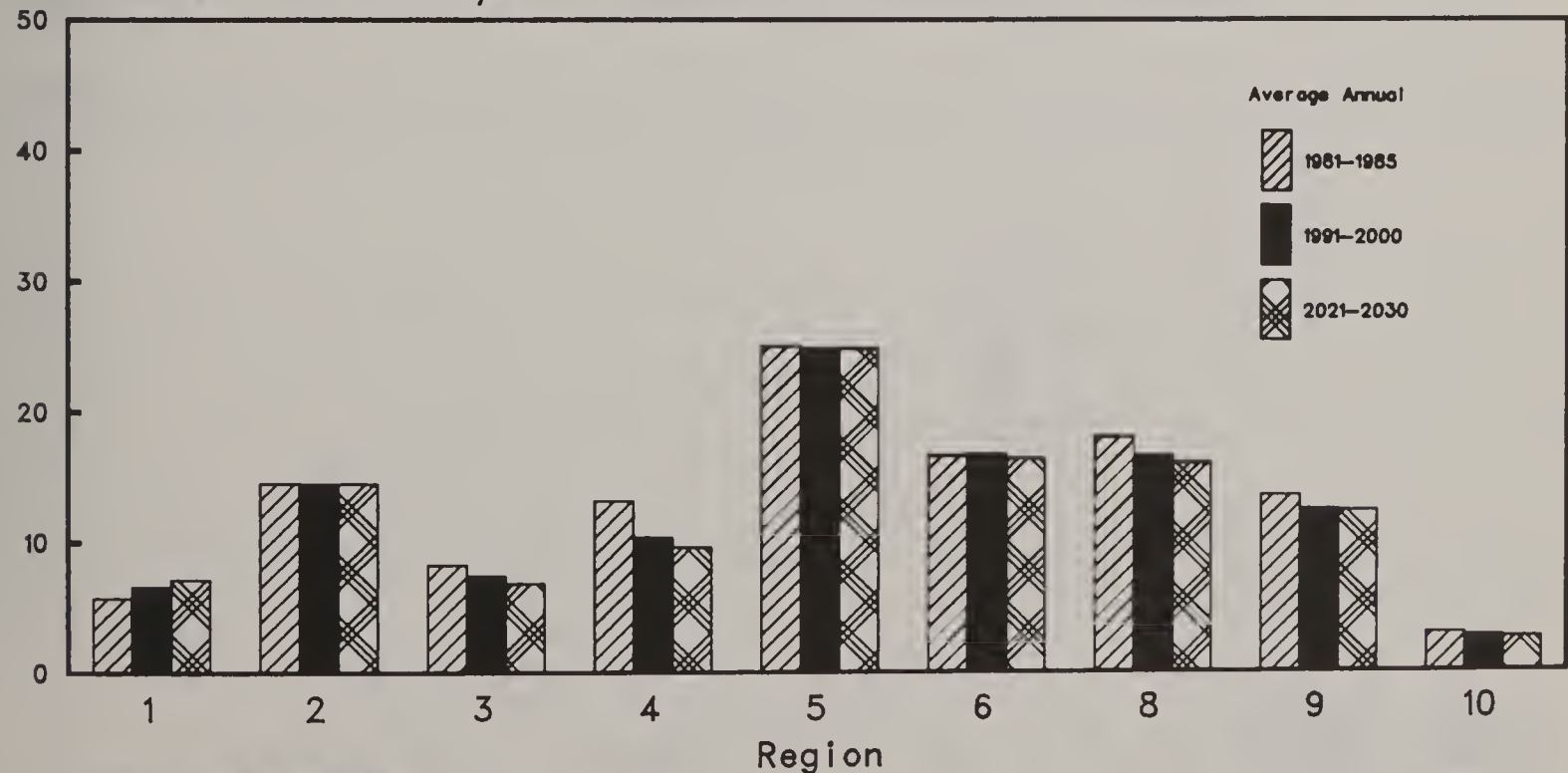


Includes Visitor Information Services

Figure 3.36

Regional Estimates-Alternative 2 Dispersed Recreation Use (NFS)

Million Recreation Visitor Days



Excludes Wilderness Use

Highlights of this Alternative are:

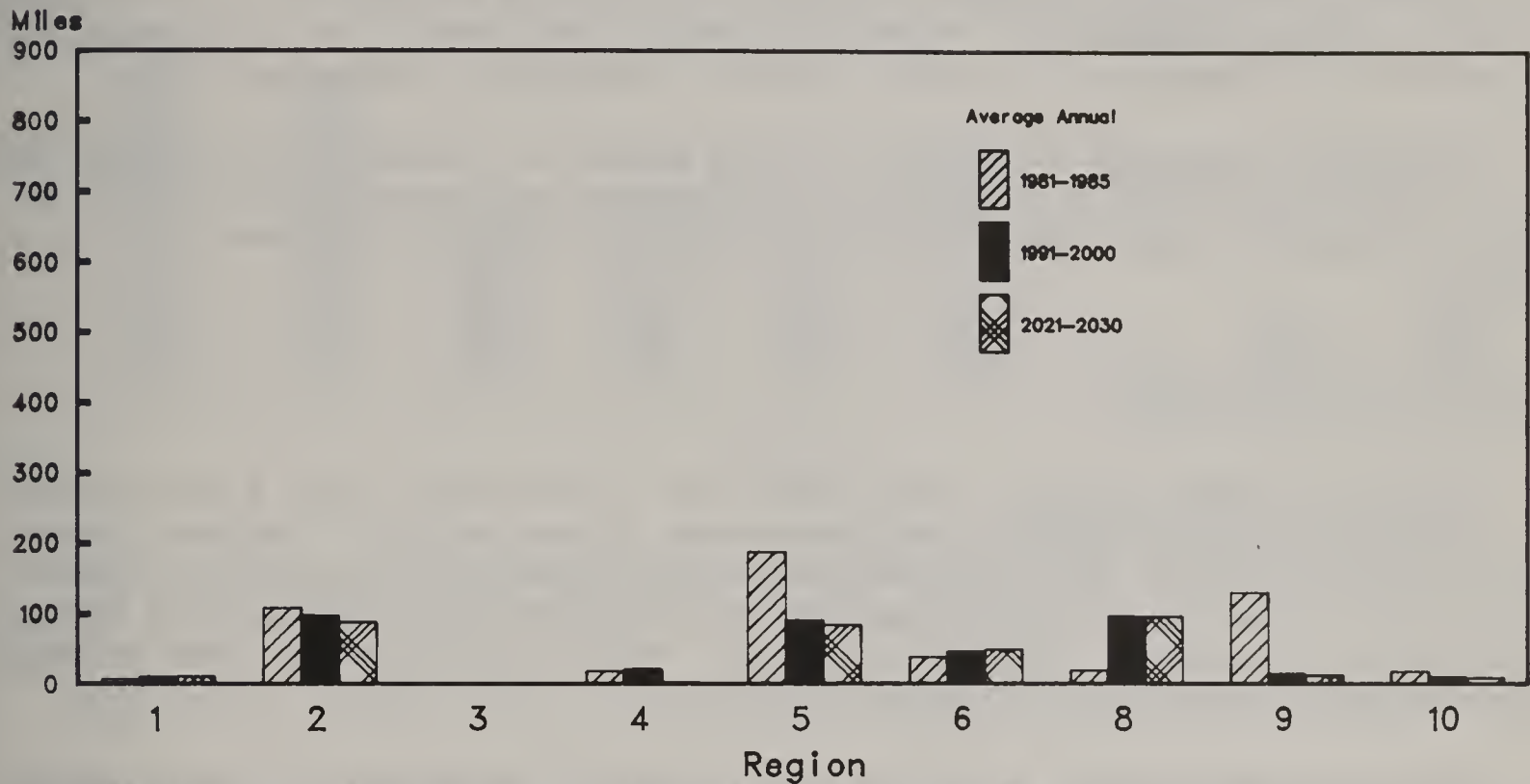
- Provide no capital investment for new recreation or trail facilities (figure 3.37).
- Allow the private sector to furnish recreational services on the National Forests with no active promotion. Direct prospective investors to develop facilities off National Forests, where possible.
- Operate all developed sites, except those designated as fee areas, at a reduced level of services.
- Provide for reduced level of services for dispersed recreation.
- Perform maintenance and rehabilitation work on facilities and trails where necessary for resource and facility protection and visitor safety. Close sites where this cannot be accomplished.
- Protect resource values by eliminating use where necessary.
- Stress protection of the resource in visitor interpretive service programs.
- Do not encourage dispersed recreation use of National Forests.
- Perform minimal level of compliance-related cultural resource work due to minimal levels of all activities. Inventories would be primarily project-related.

State and Private Forestry.--Limited planning and technical assistance would be provided on request to forest landowners who desire to incorporate dispersed recreation and esthetic improvement opportunities in multiresource forest management plans (figure 3.38).

Research.--New knowledge would be produced on how to integrate recreation with other uses and on means to reduce vandalism and user conflicts.

Figure 3.37

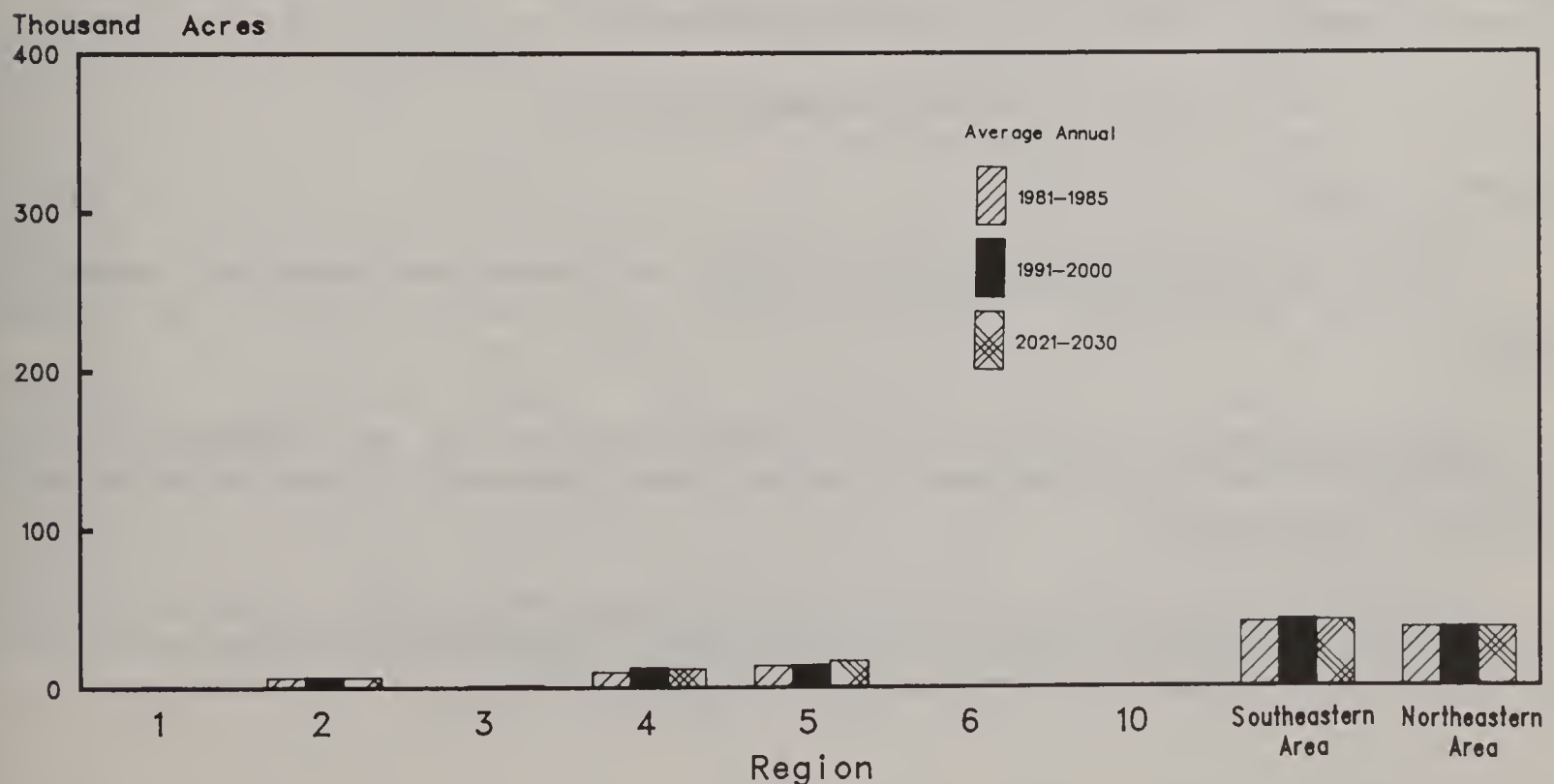
Regional Estimates-Alternative 2 **Trail Construction-Reconstruction (NFS)**



Includes All Trails: Recreation, Stock, Administrative, and Other

Figure 3.38

Regional Estimates-Alternative 2 **Technical Assistance for Dispersed Recreation (S&PF)**



National Goals

Wilderness designation, NFS.--Recommend only new wildernesses that contain very high values for primitive recreation, solitude, natural integrity, and naturalness.

Wilderness management, NFS.--Provide for limited wilderness use at levels consistent with the environment's natural sustaining capability in areas needing only minimum management. Maintain limited, but very high-value conditions for primitive recreation, solitude, natural integrity, and naturalness.

Wilderness research.--Conduct limited effort to increase development and use of scientific knowledge regarding management and protection of solitude, natural integrity, naturalness, and ecological features of extreme value.

Outputs and Activities

National Forest System.--The target for Alternative 2 would provide for an increase of approximately 6 million acres of designated wilderness above the 4.5 million acres under consideration or proposed and endorsed for addition to the Wilderness System (table 3.5). Only the most outstanding areas of potential wilderness would be selected. The distribution of this increase among Regions is depicted in figure 3.39.

Wilderness management in Alternative 2 would be limited to the minimum necessary to protect and perpetuate the wilderness resource. Wilderness use would slightly increase because of some additional acreage and the yearly increased use increment experienced in the past few years. Additional direct controls on the number of visits would probably be necessary to protect the wilderness values in lieu of applied management techniques possible under other Alternatives.

Research.--Research would determine how to maintain isolation from sights, sounds, and presence of others; ensure that long-term ecological processes remain intact; and identify endangered or threatened species.

Wildlife and Fish

National Goals

Endangered and threatened species, NFS.--Protect and conserve federally listed plants and animals. Provide habitat improvements required by recovery plan.

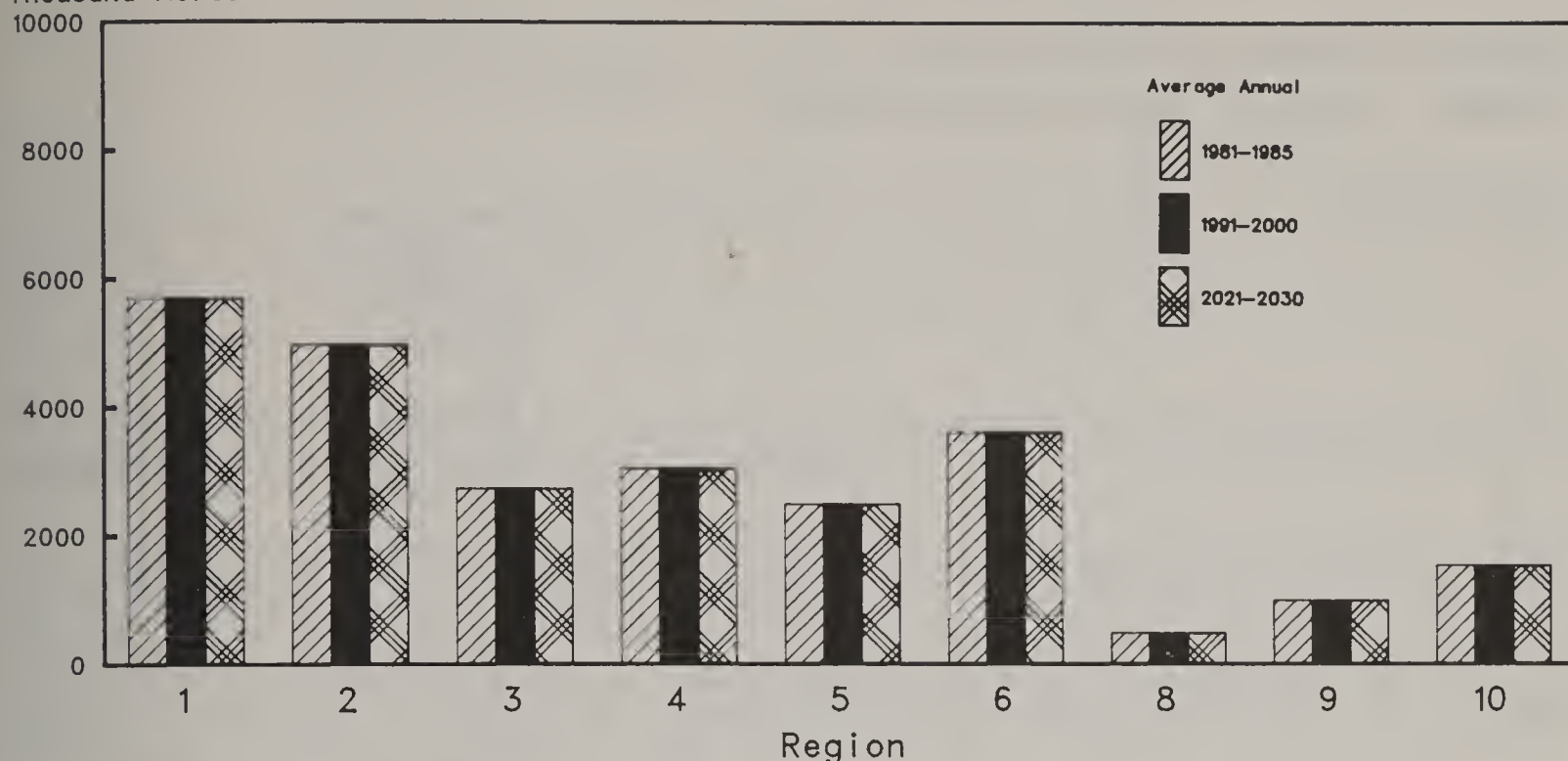
Habitat diversity, NFS.--Provide habitat diversity, well distributed on each National Forest, to maintain viable populations of all vertebrates and selected invertebrates.

Enjoyment of wildlife and fish in developed areas, NFS.--Maintain existing habitat for appreciative (nonconsumptive) enjoyment of wildlife and fish available at selected developed recreation and VIS areas.

Regional Estimates-Alternative 2

Wilderness Management (NFS)

Thousand Acres



Fish habitat improvements, NFS.--Manage anadromous and resident fish habitat to produce at 60 percent or more of potential.

Population levels, NFS.--Manage habitat to provide low population levels.

Cooperation with others, S&PF.--Provide a low level of technical assistance to private landowners for wildlife and fish production on forested lands.

Wildlife, fish, and plant habitat research.--Develop and use scientific knowledge about threatened and endangered animals and demonstrate methods to apply available information about selected species and their habitats.

Outputs and Activities

National Forest System.--Wildlife habitat improvements would decrease from 2.3-million acre equivalents in 1978 to 1.2 million in 1985 and further to 0.3 million in 2025. Anadromous fish habitat improvements would increase the contribution of the National Forests to the commercial salmon fishery by 2.6 million pounds in 1988 and level off through 2025 (figure 3.41). The low level of market outputs would mean abundant habitat for wildlife dependent on dead trees, old-growth trees, and dense riparian vegetation.

Species requiring early stages of succession would be at low-to-moderate, yet viable, population levels. The high-level program in Region 8 relative to the other Regions as displayed by figure 3.40, is due to habitat improvement resulting from prescribed burning. The depicted decline beyond 1981-85 is because no habitat improvements are made, except for endangered and threatened species, by definition of this Alternative as a declining program.

It is anticipated that the population levels of certain management indicator species would respond by 1995 as follows:

Figure 3.40

Regional Estimates-Alternative 2 Wildlife Habitat Improvement (NFS)

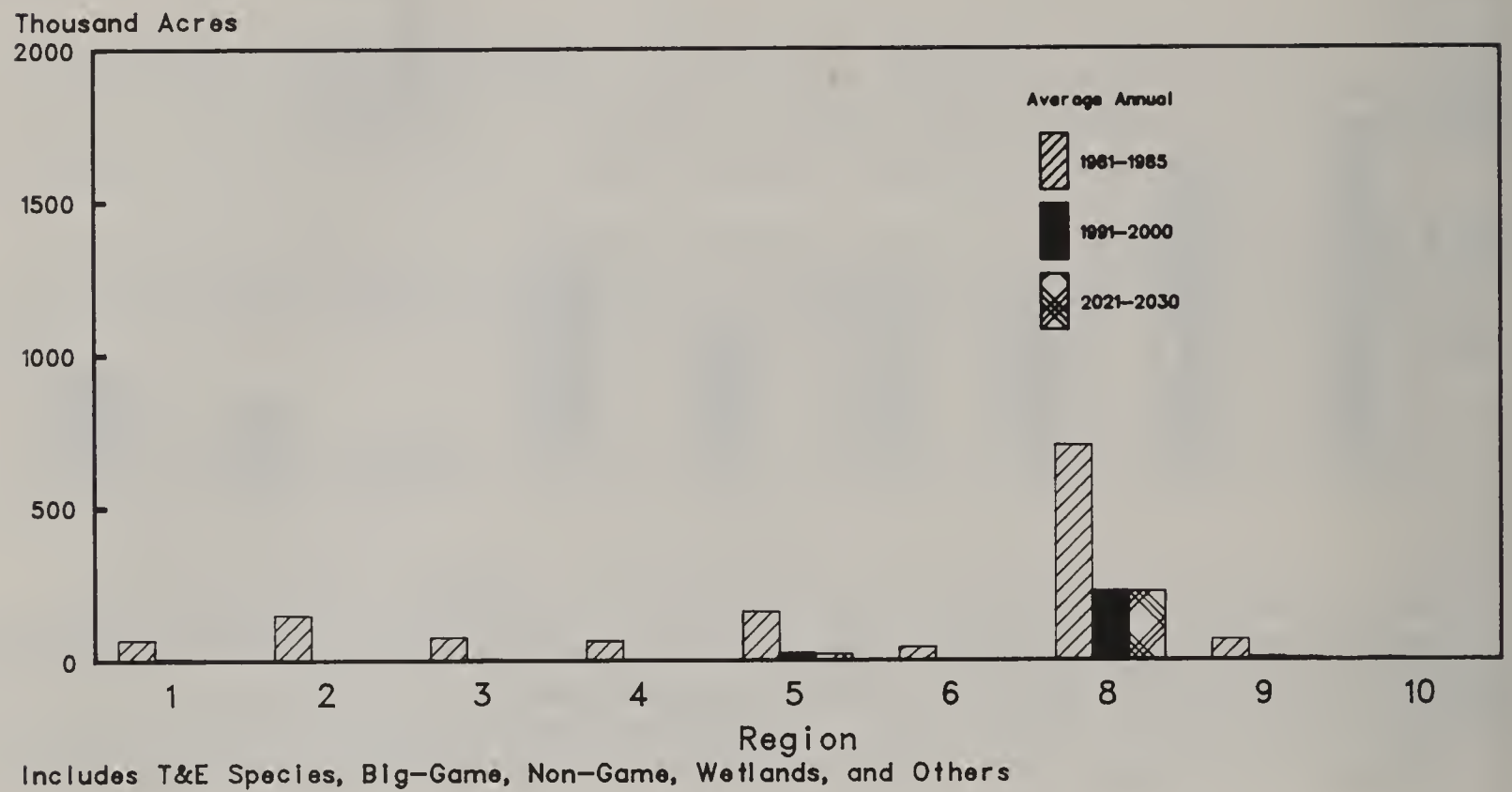
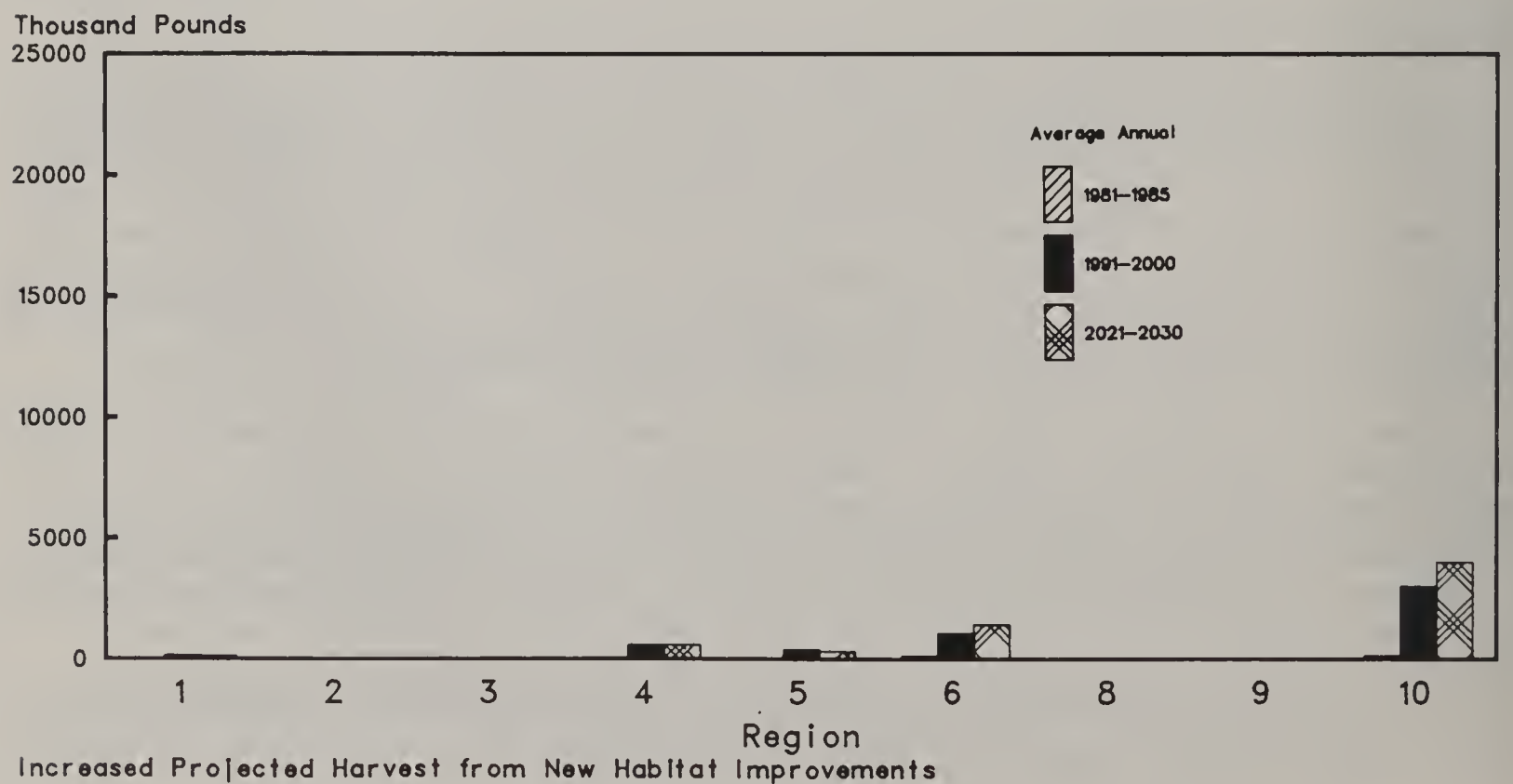


Figure 3.41

Regional Estimates-Alternative 2 Anadromous Fish (NFS)



Management Indicator Species Index (current situation = 100)

<u>Species</u>	<u>Alternative 2</u>
Mule deer	80
White-tailed deer	90
Black-tailed deer	90
Elk	80
Wild turkey	90
Cavity nesting birds	90
Resident trout	90
Anadromous fish	80

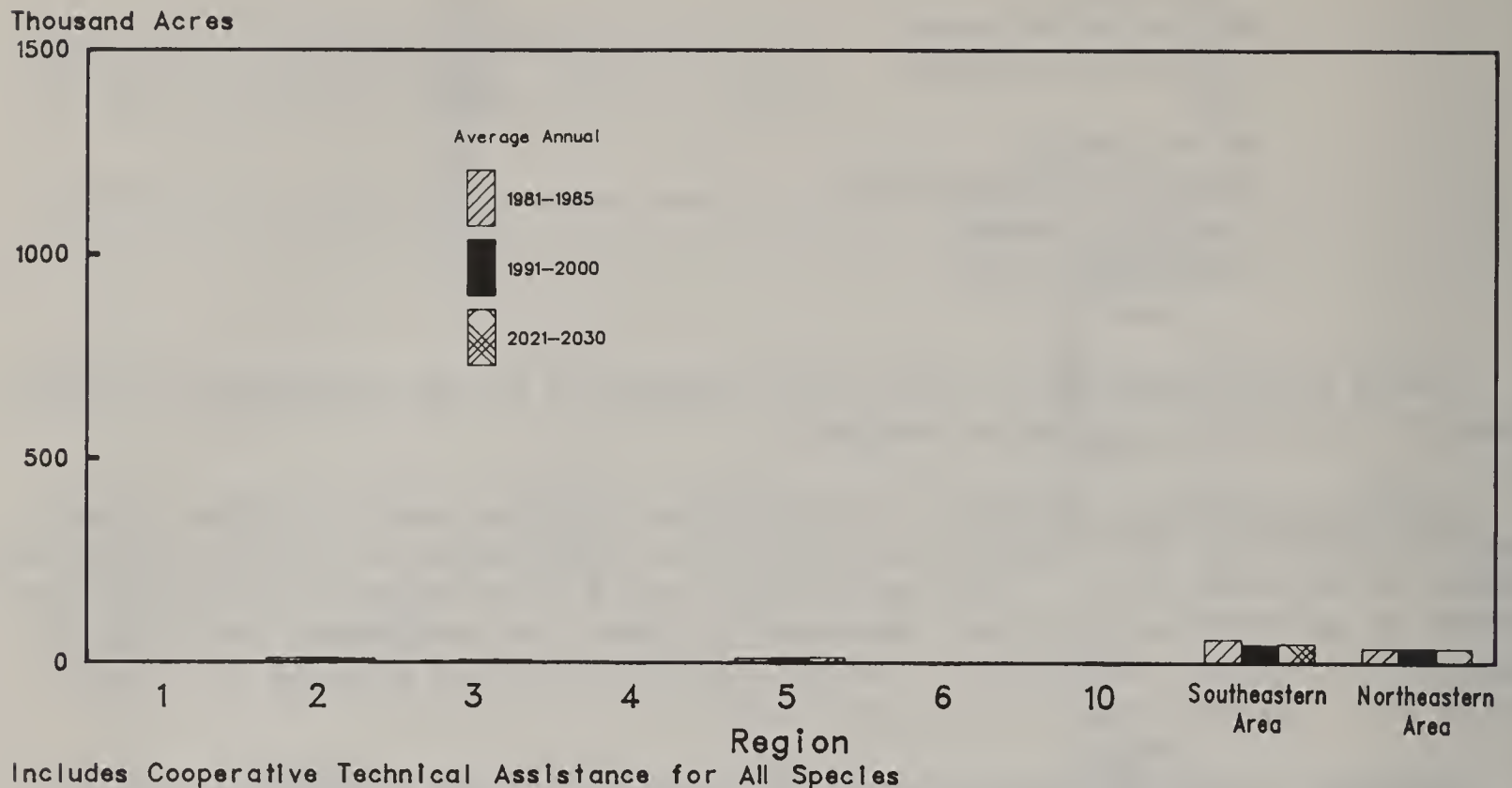
Since Alternative 2 is a declining program it is not responsive to public comments calling for increased emphasis.

State and Private Forestry.--Cooperative programs would provide a low level of technical and related assistance for improvement of wildlife and fish habitat on private lands. This assistance would occur primarily through preparation of multiresource forest management plans for landowners who wish to emphasize wildlife production. The anticipated affected acreage is illustrated on a regional basis by figure 3.42.

Research.--New information would be produced on the population biology, distribution, and habitat requirements of threatened and endangered species and for species whose current population status is undetermined. Collected data would provide a basis for managing selected endangered and threatened species.

Regional Estimates-Alternative 2

Technical Assistance for Wildlife Habitat Improvement (S&PF)



Range

National Goals

Range management, NFS.--Provide forage production for livestock grazing only within the sustained natural capacity of the range and within constrained investments by reducing number of permitted livestock; phase out least cost-effective management systems; and restrict structural and nonstructural improvements and treatments to those rangelands in unsatisfactory condition upon which grazing would continue.

Cooperation with others on non-Federal forested ranges, S&PF.--Maintain a low level of cooperation and technical assistance on non-Federal forested ranges in cooperation with other agencies.

Range research.--Develop and use scientific knowledge to gain an understanding of selected range ecosystems for livestock production.

Outputs and Activities

National Forest System.--Livestock grazing use in the National Forest System would decrease from the present 9.9 million animal-unit-months to approximately 6.2 million animal-unit-months in 2025. Capital investments would be reduced to a negligible amount. Extensive grazing of native forage species would be permitted on suitable areas. It is estimated there would be a slight reduction in acreage grazed from 103 million acres to 100 million acres by 2025. Existing intensive grazing systems such as rest-rotation, would be discontinued as the improvements wore out. More extensive systems of grazing would be employed. Under Alternative 2, it is anticipated that very little

change in rangeland ecological conditions would take place. Returns to government would be reduced. Unit costs for operation and maintenance of the program would increase dramatically in the early years of implementation due to downward livestock adjustments. Intensive range inventory, analysis, and planning to support the grazing adjustment would be necessary. The three evaluation and testing programs presently underway would be phased out, and little would be done to aid dependent farm communities associated with the National Forest System lands. It could be anticipated that grazing in the Eastern United States would be held constant or decline slightly with the livestock adjustment taking place on the more traditional grazing areas of the western National Forests (figure 3.43). Utilization of the Range Betterment Fund, as authorized under the Federal Land Policy and Management Act of 1976, would be terminated after 1985.

State and Private Forestry.--Technical assistance for forage production on non-Federal forested ranges would be minimized (figure 3.44). Assistance would occur primarily through incorporation of range objectives where appropriate in multiresource forest management plans. Accomplishments resulting from Federal assistance would be very low throughout the planning period.

Research.--Research would provide information on how to enhance the quality and quantity of livestock production on selected rangelands. New data on rangeland ecosystems would increase the manager's capability to determine the types of grazing systems that should be used in order to best protect all the resources involved. Research would develop processes for analyzing range resource conditions and disseminating collected information.

Timber

National Goals

Timber supply, NFS.--Supply timber at significantly less than current levels.

Silvicultural practices, NFS.--Limit the application of silvicultural practices to selected high-productivity sites, primarily for sawtimber.

Wood utilization, NFS.--Maintain utilization standards for timber and wood fiber from harvested areas.

Cooperation in private forest management, S&PF.--Decrease efforts to expand private timber supply.

Cooperation in wood utilization, S&PF.--Continue efforts to improve use of wood fiber, but less than current levels.

Timber management research.--Maintain current applied research to support extensive timber culture on best sites consistent with approved protection strategies.

Forest products utilization research.--Direct research toward a few selected problems of critical importance such as increased hardwood utilization and protection and maintenance of the forest resource.

Figure 3.43

Regional Estimates-Alternative 2 Grazing Use (NFS)

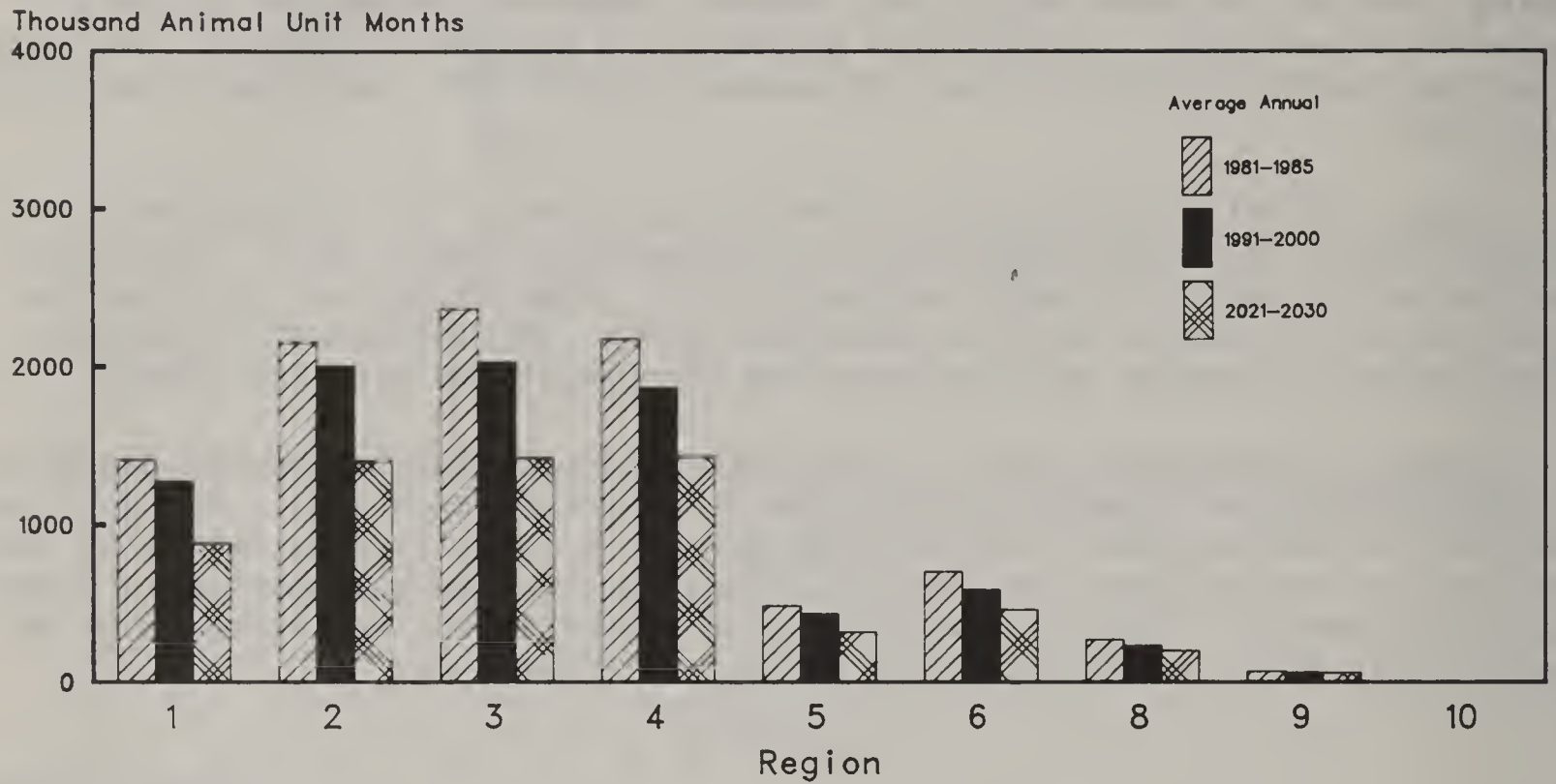
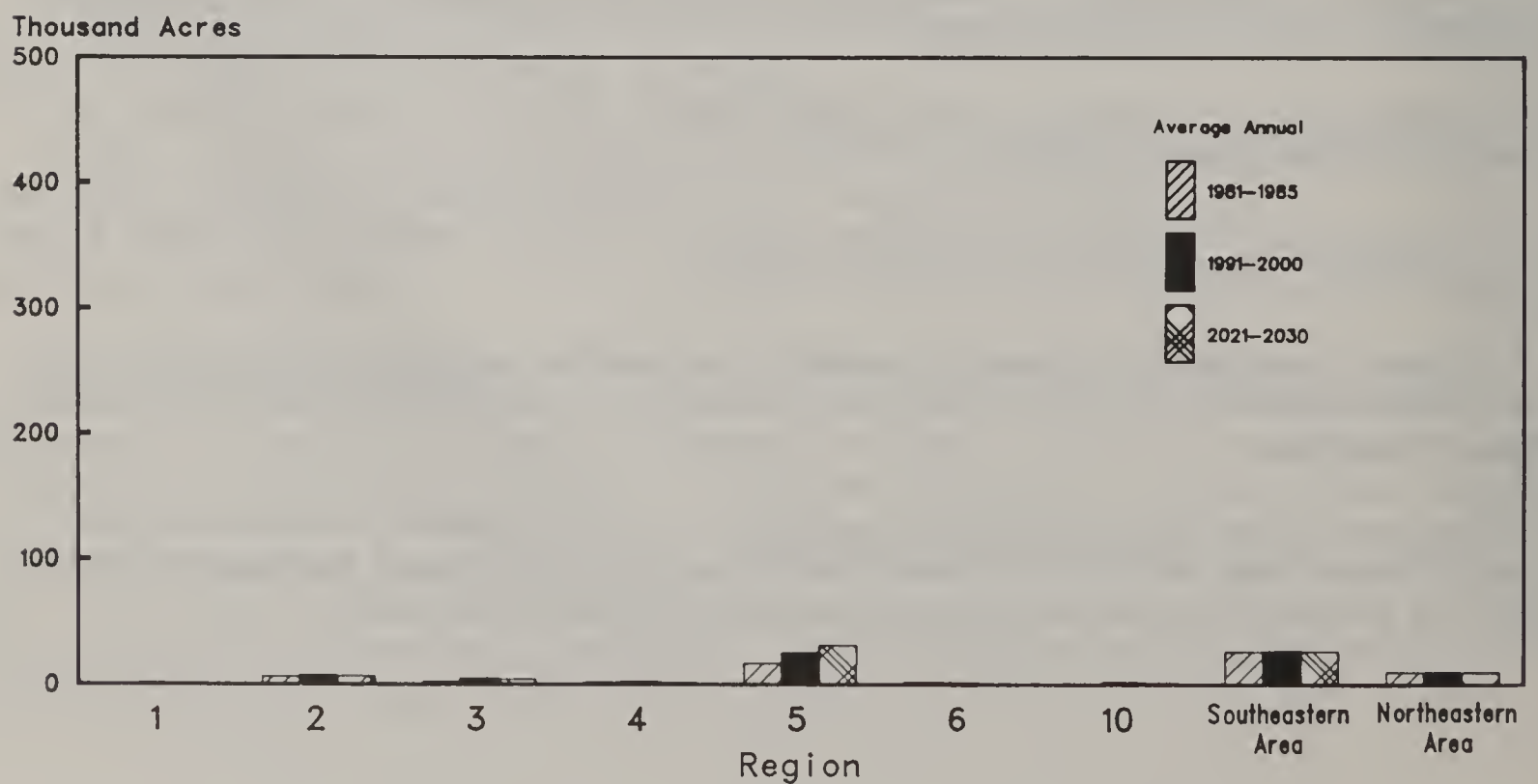


Figure 3.44

Regional Estimates-Alternative 2 Technical Assistance for Range Improvement (S&PF)



Forest engineering research.--Focus research efforts on wood energy development, application, and conservation. Maintain a low level of activity of thinning and forest residues harvesting.

Outputs and Activities

National Forest System.--Under Alternative 2, National Forest System timber sale offerings would decrease from 12.2 billion bd. ft. in 1978 to 8.2 billion bd. ft. local scale in 2025 (figure 3.45). Timber harvests would be limited to currently accessible, highly productive commercial forest land, phasing out harvest on less productive areas and areas with critical soil stability situations. Mortality volume would be harvested promptly in accessible areas. Annually reforest 206,000 acres by 2025 on those regeneration-harvested lands and catastrophically deforested lands that are currently accessible where adequate natural regeneration is not expected within 5 years of harvest or deforestation (figure 3.46). Lower stocking levels would be accepted such that full stocking may not be reached until normal rotation age. Stand tending, genetic improvement, and fertilization practices would not be carried out (figure 3.47). The removal of timber and wood fiber waste from harvested areas would be promoted to extend the limited timber supply for all uses as demand dictates. A total of 305,000 acres of reforestation backlog would be regenerated on selected high production sites.

For NFS, Alternative 2:

- Is least supportive of the wood-for-energy concept, as this Alternative provides the lowest National Forest output. In addition, since Forest Service actions would increase stumpage price, utilization standards would increase, further reducing available residues.
- Contributes least of all Alternatives to increase softwood production. Results in the largest anticipated increases in stumpage price, particularly in the Rocky Mountains.

State and Private Forestry.--The production of market and nonmarket outputs would be deemphasized by State and Private Forestry programs.

Increased stumpage prices that might result from reduced harvests on National Forest lands would encourage private landowners to increase timber harvesting and encourage timber industries to better utilize available wood. It is less likely, however, that increased private acreages would be reforested or receive cultural treatments, particularly in the short run. Thus, in the long run, the situation would become worse.

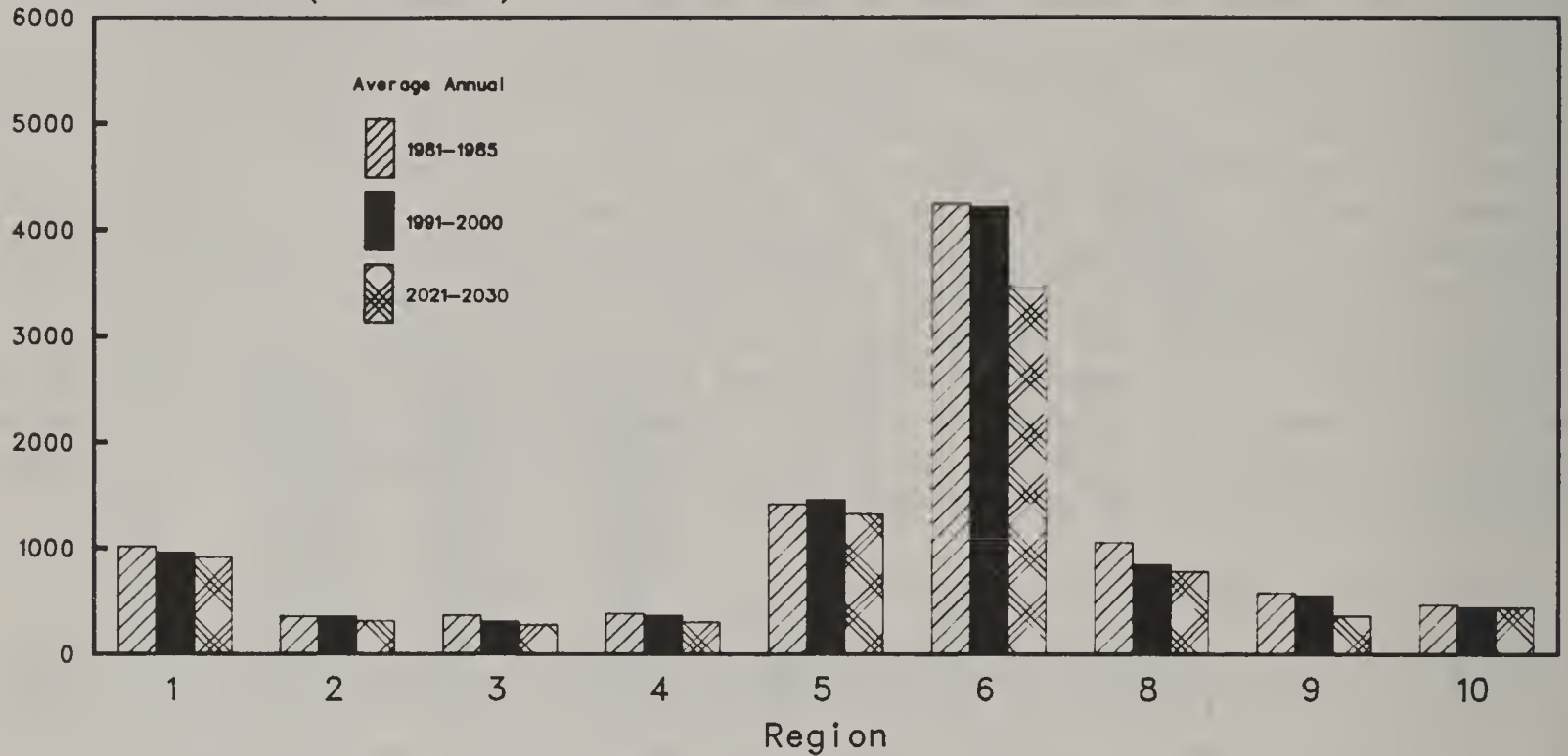
Federal financial and technical assistance programs for forest practices on nonindustrial private forest lands would operate below current levels. Most of the initiative and capital for forestry practices on these lands would come from State, local, and private sources. Increased emphasis would be placed on encouraging landowner investments without Federal financial assistance and on strengthening referrals to private forestry consulting firms.

Federally assisted reforestation (figure 3.48) and timber stand improvement (figure 3.49) would increase slightly in 1981 and 1982 based upon a current backlog of approved and funded FIP and ACP projects that have not been

Figure 3.45

Regional Estimates-Alternative 2 Programmed Sales Offered (NFS)

Million Board Feet (Local Scale)

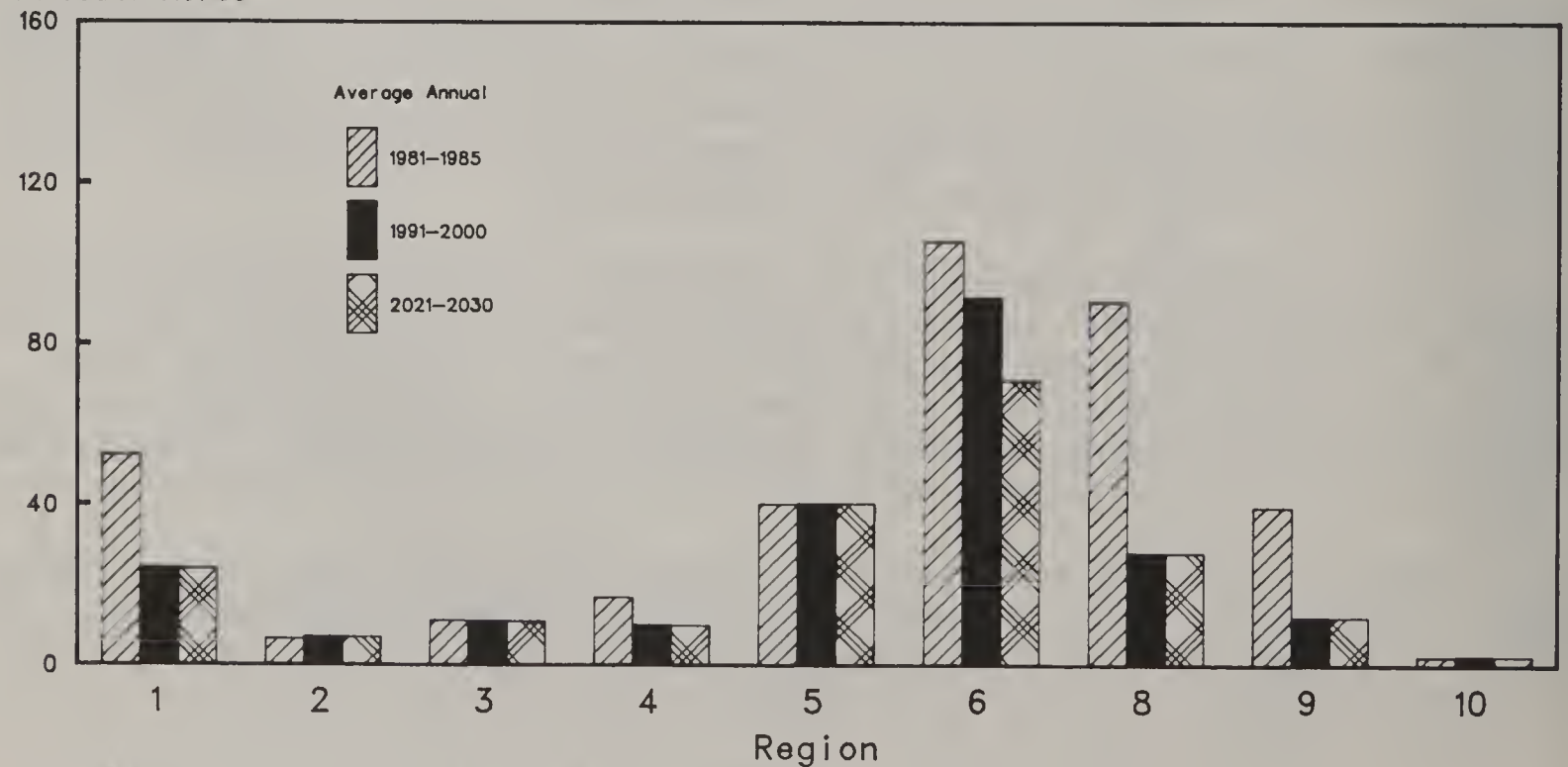


Includes Live and Mortality; Hardwood and Softwood

Figure 3.46

Regional Estimates-Alternative 2 Reforestation (NFS)

Thousand Acres



Includes KV and Appropriated Funds

Figure 3.47

Regional Estimates-Alternative 2 Timber Stand Improvement (NFS)

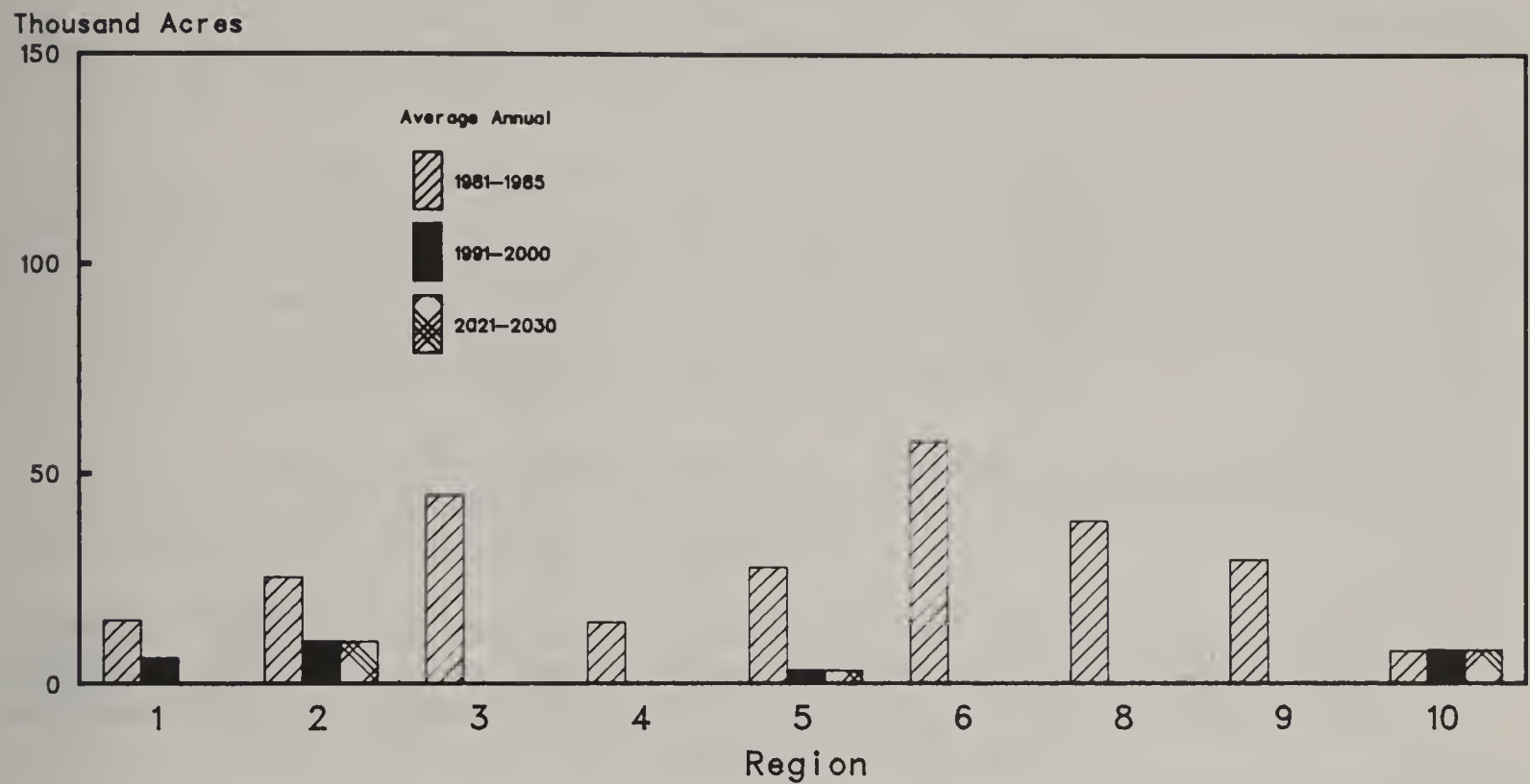
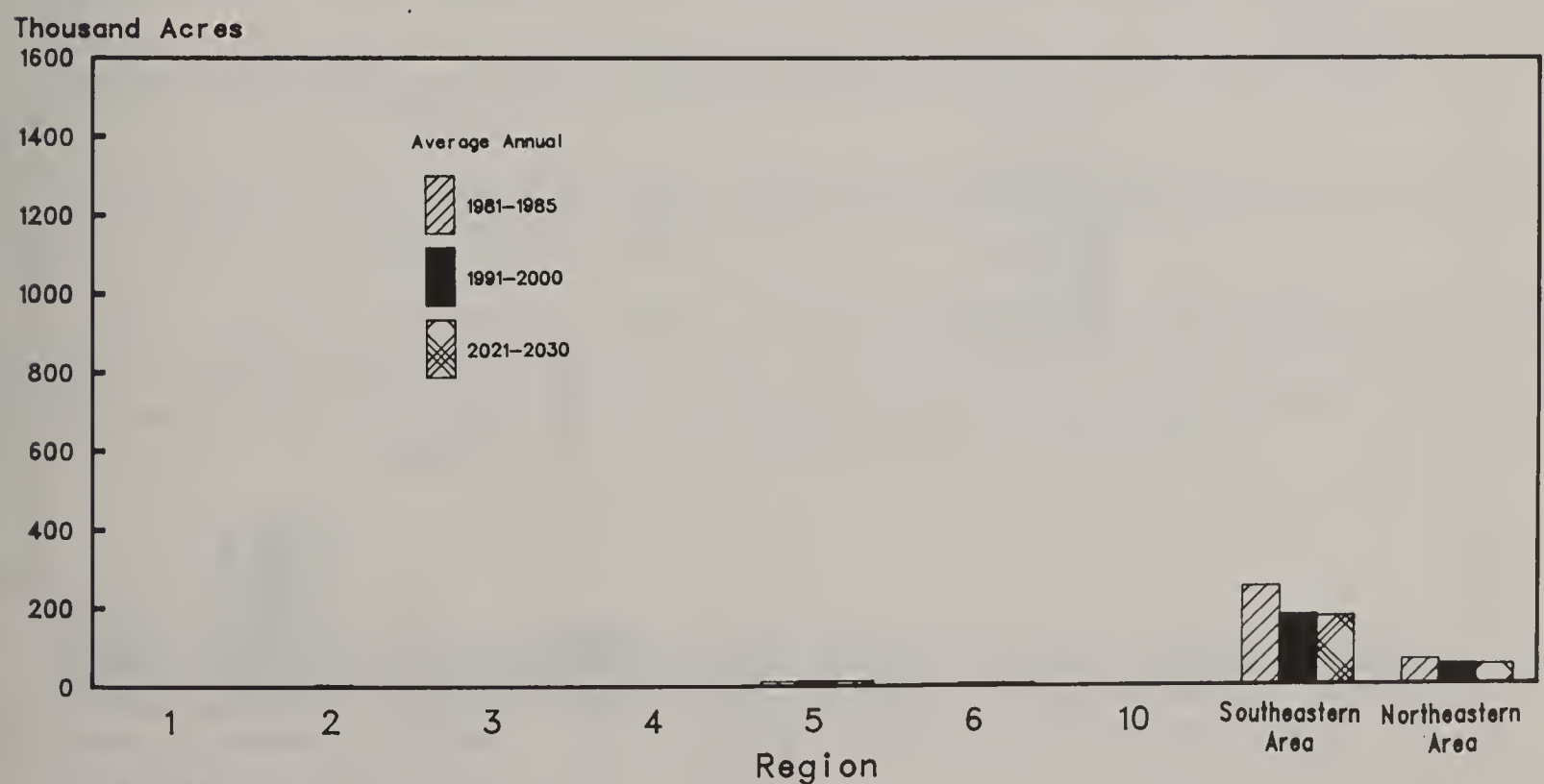


Figure 3.48

Regional Estimates-Alternative 2 Reforestation (S&PF)



Includes RFA, FIP, and ACP

Figure 3.49

Regional Estimates-Alternative 2 Timber Stand Improvement (S&PF)

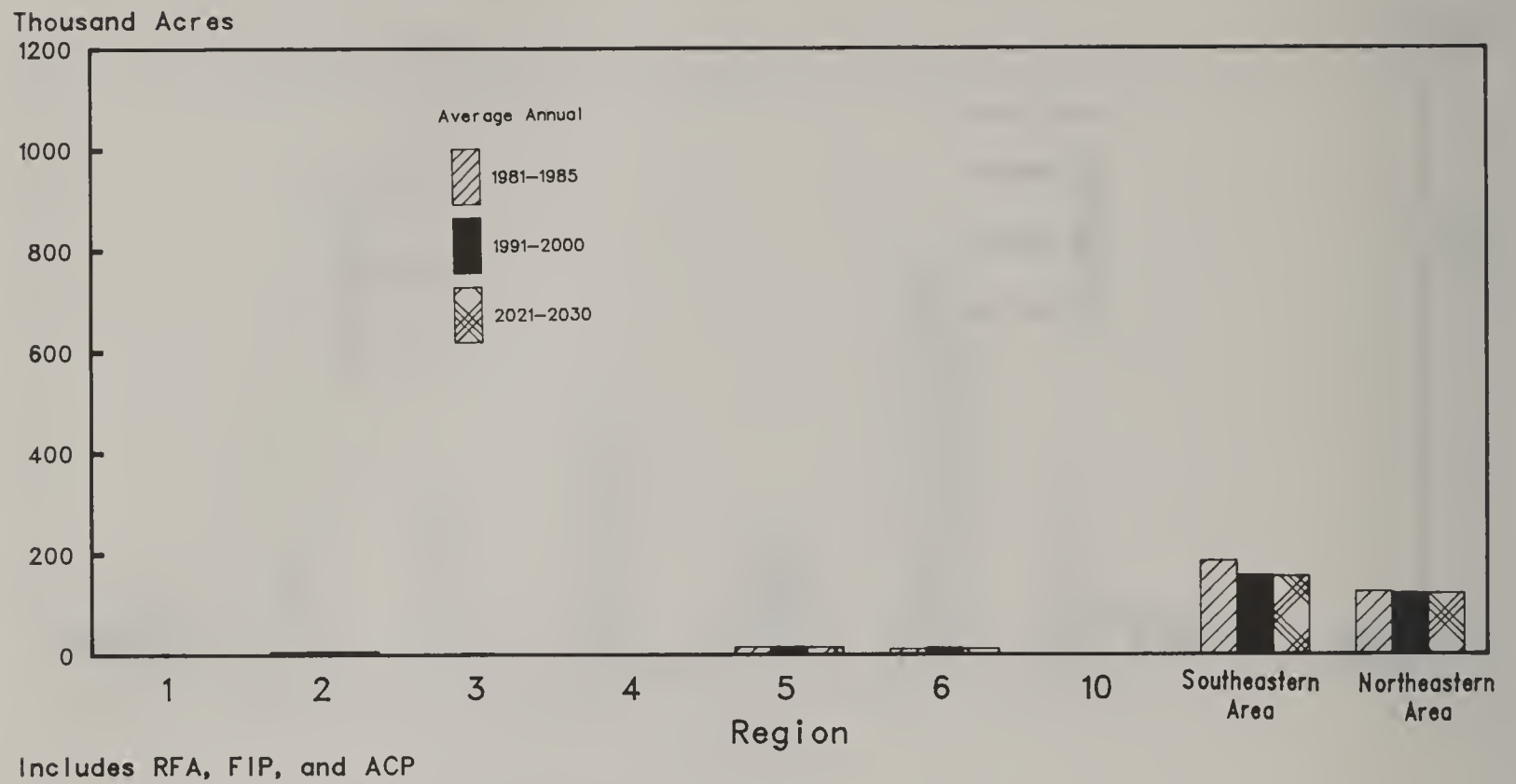
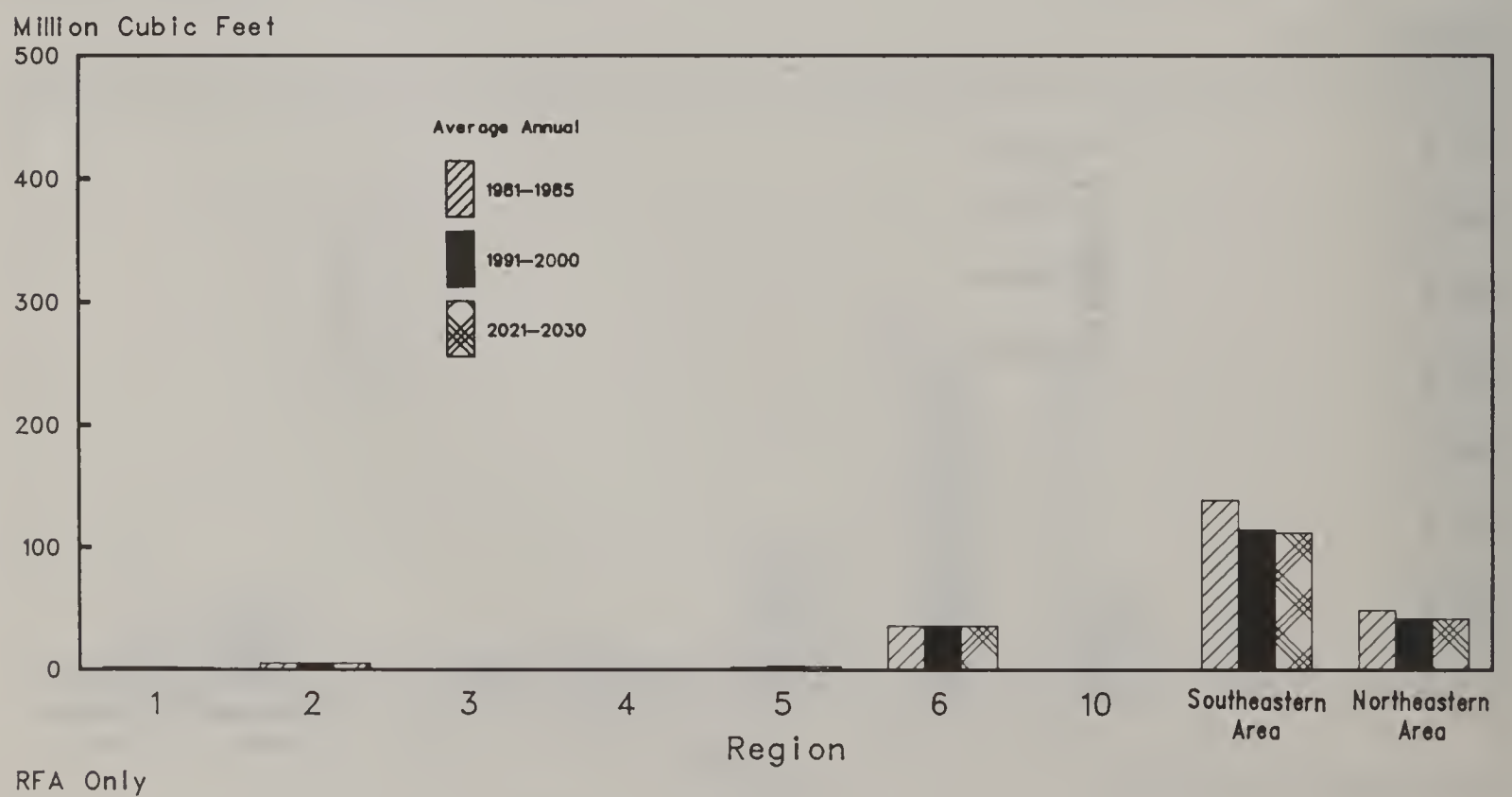


Figure 3.50

Regional Estimates-Alternative 2 Timber Prepared for Harvest (S&PF)



completed. Thereafter, the Federal role would decrease and remain at a low level (table 3.6). There would be less assistance in preparing timber for harvest (figure 3.50), and fewer numbers of woodland owners assisted (figure 3.51).

Less Federal assistance would also be provided for more efficient wood utilization. However, the volume of wood saved could increase moderately in some local areas since each utilization improvement would be applied to the larger anticipated harvest volume from private lands. Expected volumes resulting from federally assisted wood utilization improvements are illustrated on a regional basis in figure 3.52.

Research.--Timber management research: All basic research would be curtailed. Research efforts would focus on updating existing management guides for only the most important commercial forest tree species. Management strategies explored would concentrate on custodial and extensive management (low investment), with only a moderate intensity of timber culture on the best sites, consistent with recognized protection procedure.

Forest products utilization research: Research results would be available to forest land managers on the utilization practices best suited to protect and maintain the forest resources.

Forest engineering research: Results of TSI harvesting research on public lands would be provided to State and private forest landowners. The benefits of conserving energy and the advantages of wood to supplement our energy requirements would be determined and published.

Water

National Goals

Technical water support services, NFS.--Limit technical water support services to those needed to maintain water quality.

Water quality improvement NFS.--Limit implementation of water resource improvements to those needed to meet established water quality goals.

Water yield, NFS.--Limit implementation of water yield improvement practices to existing commitments.

Cooperation with others, S&PF.--Maintain minimum cooperative efforts with Federal, State, and local water agencies.

Water resource research.--Limit research effort to development and use of scientific knowledge to maintain onsite water resource quantity and quality for recreation and propagation of fish and wildlife, and eliminate discharge of pollutants with emphasis on maintaining aquatic ecosystems.

Outputs and Activities

National Forest System.--Water activities in this element exceed support services required to provide for nondegradation of the water resource due to other resource activities. Water quality goals would be met for all water yielded from the National Forests by the year 2000. The detail and quantity

Figure 3.51

Regional Estimates-Alternative 2 Woodland Owners Assisted (S&PF)

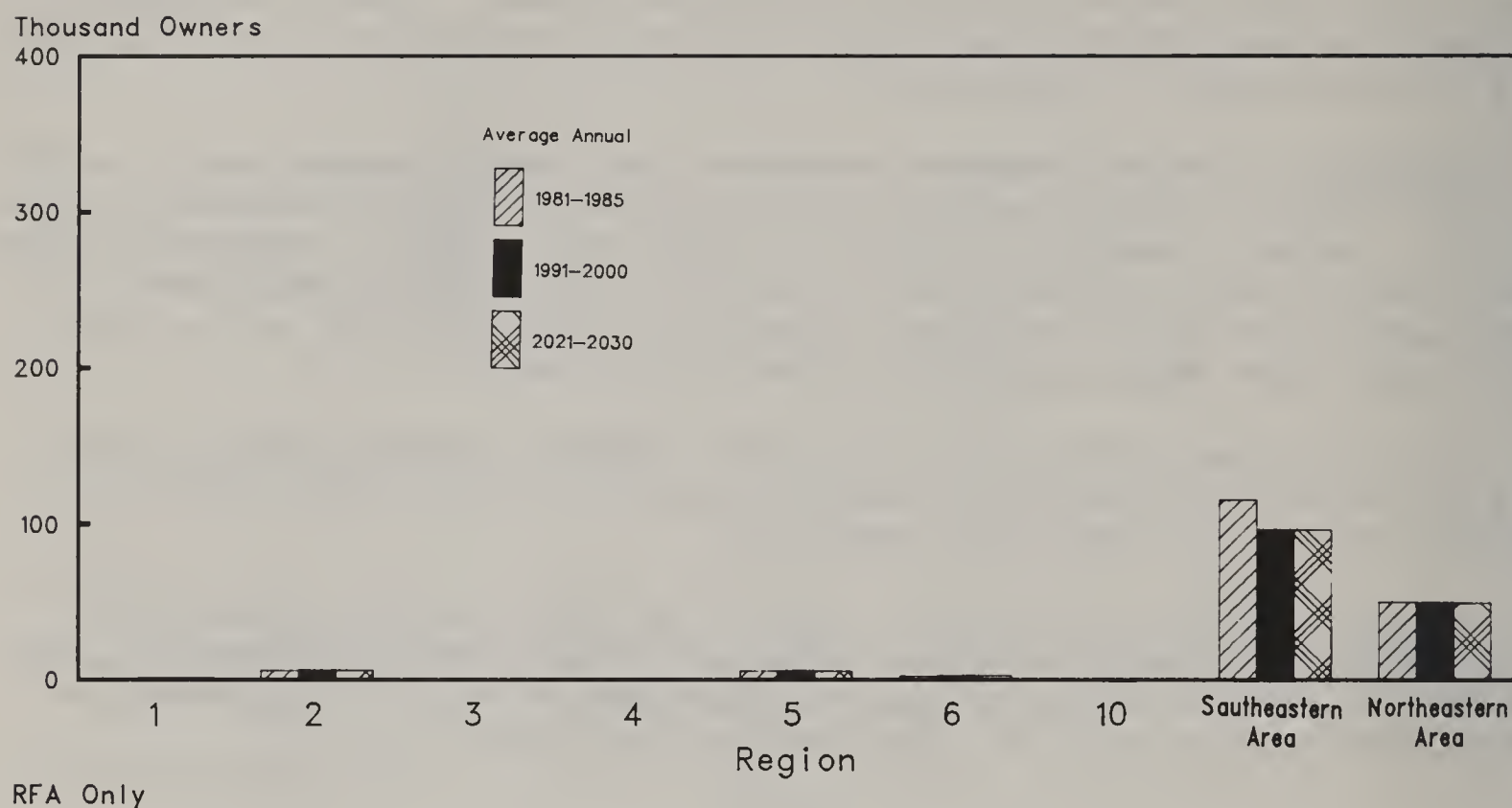


Figure 3.52

Regional Estimates-Alternative 2 Improved Wood Utilization (S&PF)

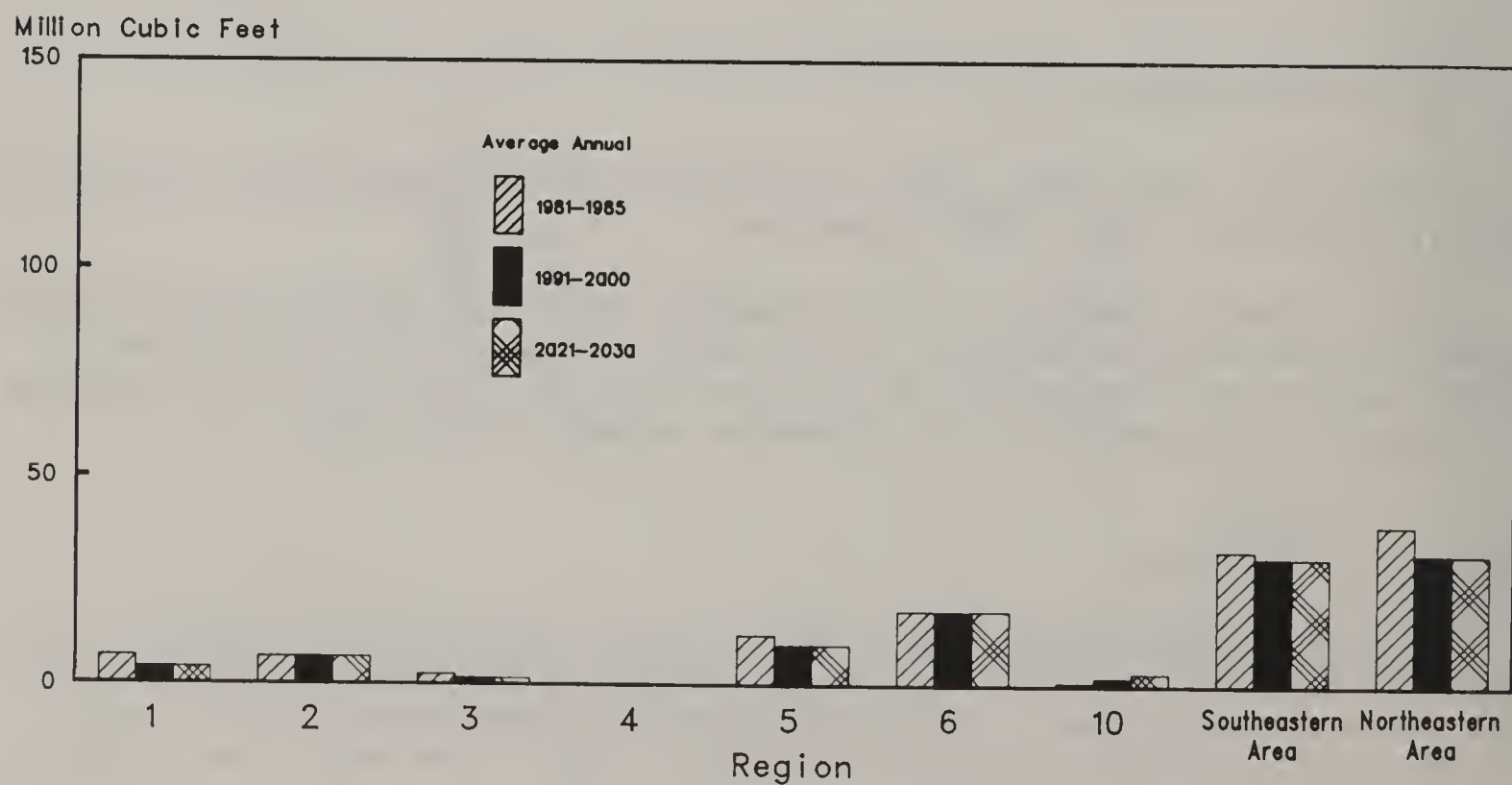
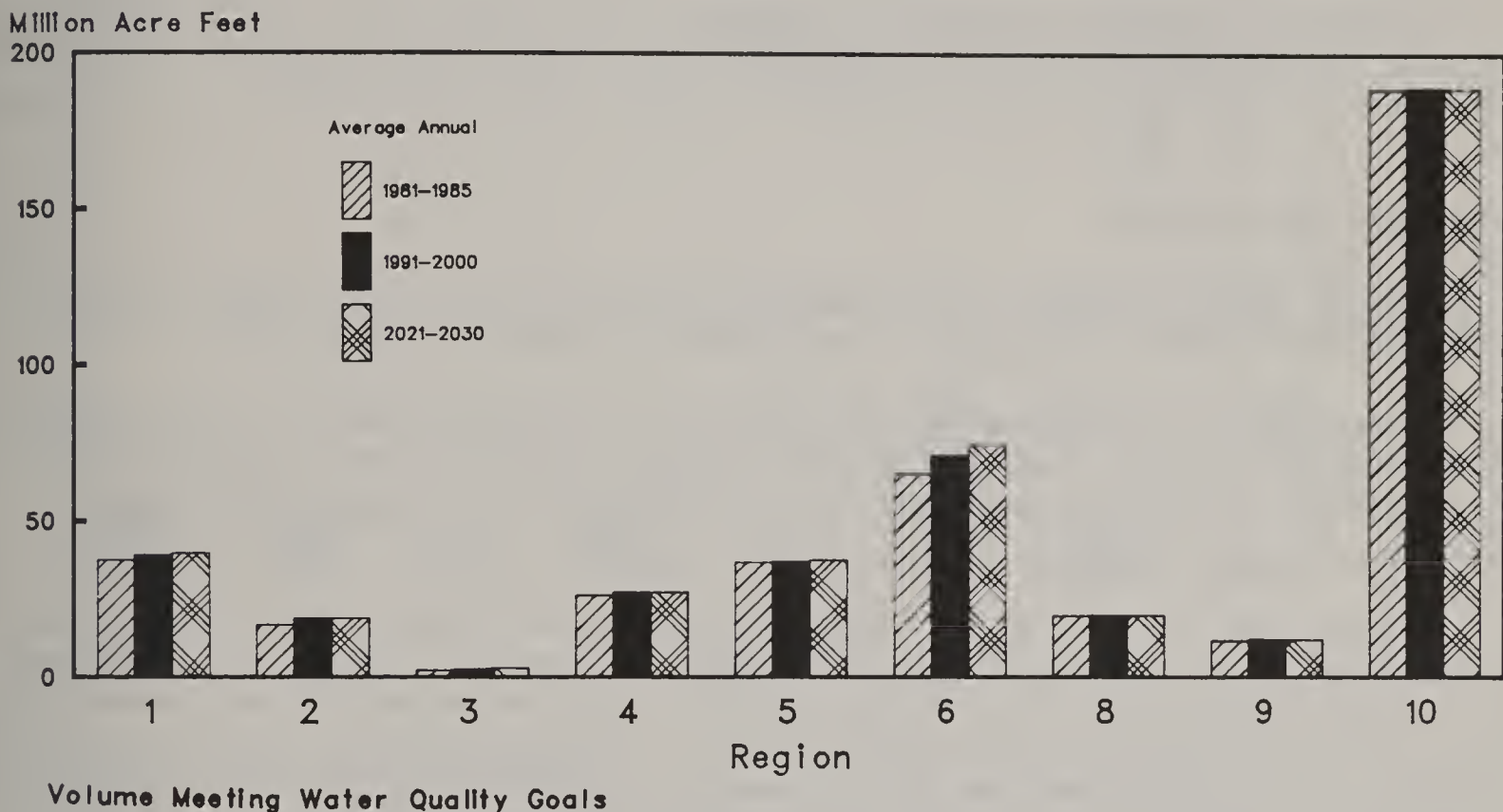


Figure 3.54

Regional Estimates-Alternative 2 Water Quality (NFS)



of water resource inventories would decrease commensurate with low levels of outputs. Resource improvements would be limited to maintenance of existing water quality and quantity. Resource improvement maintenance would be decreased because of limited levels of resource management. Water yield would not change. The volume of water meeting water quality goals is presented in figure 3.54.

State and Private Forestry.--Technical assistance for protecting and improving the quality, quantity, and timing of water yields from non-Federal forest lands would be available only on a limited basis in high value areas.

Research.--Research would determine the water resource amenities and requirements for recreation and propagation of fish and wildlife. Nonpoint source pollution from forest and range ecosystems would be assessed, its effects on aquatic ecosystems evaluated, and control measures developed.

National Goals

Operations, NFS.--Limit action on mineral proposals, giving priority to energy and to the 1872 mining law operations.

Assistance to States and private landowners, S&PF.--Cooperate with States and private landowners in reclamation planning where State and private mineral operations may adversely affect the NFS.

Surface environment and mining research.--Develop and use scientific knowledge to meet water quality standards for streamflow from mined areas and to maintain integrity of undisturbed ecosystems near mined areas.

Outputs and Activities

National Forest System.--This Alternative calls for the lowest management effort and assistance toward the development of mineral resources.

It recognizes the demand for minerals will rise and that, in accordance with mining and mineral laws which permit and encourage minerals activities, certain actions would be required when National Forest System lands are involved.

However, the processing of mineral lease applications, operating plans, and the completion of environmental analyses and reports cannot be expedited. Some laws and regulations set forth specific time restrictions for processing actions. These requirements would be met to the best of the manager's ability. Processing of applications involving energy-related activities would receive priority over other applications. Managers' efforts, in general, would be limited to those which are sufficient to ensure compliance with NEPA and reclamation laws and regulations.

This program level would permit the handling of an estimated 14,700 operating plans in 1981, which could be expected to increase to 20,100 by 2025 (figure 3.55).

Returns to the Federal and States' treasuries would be reduced. The United States' reliance on imports of mineral commodities would not be reduced to acceptable levels as rapidly as desired at this program level.

Administrative costs for managing the surface resources disrupted by mineral activities would be reduced since there would be fewer activities.

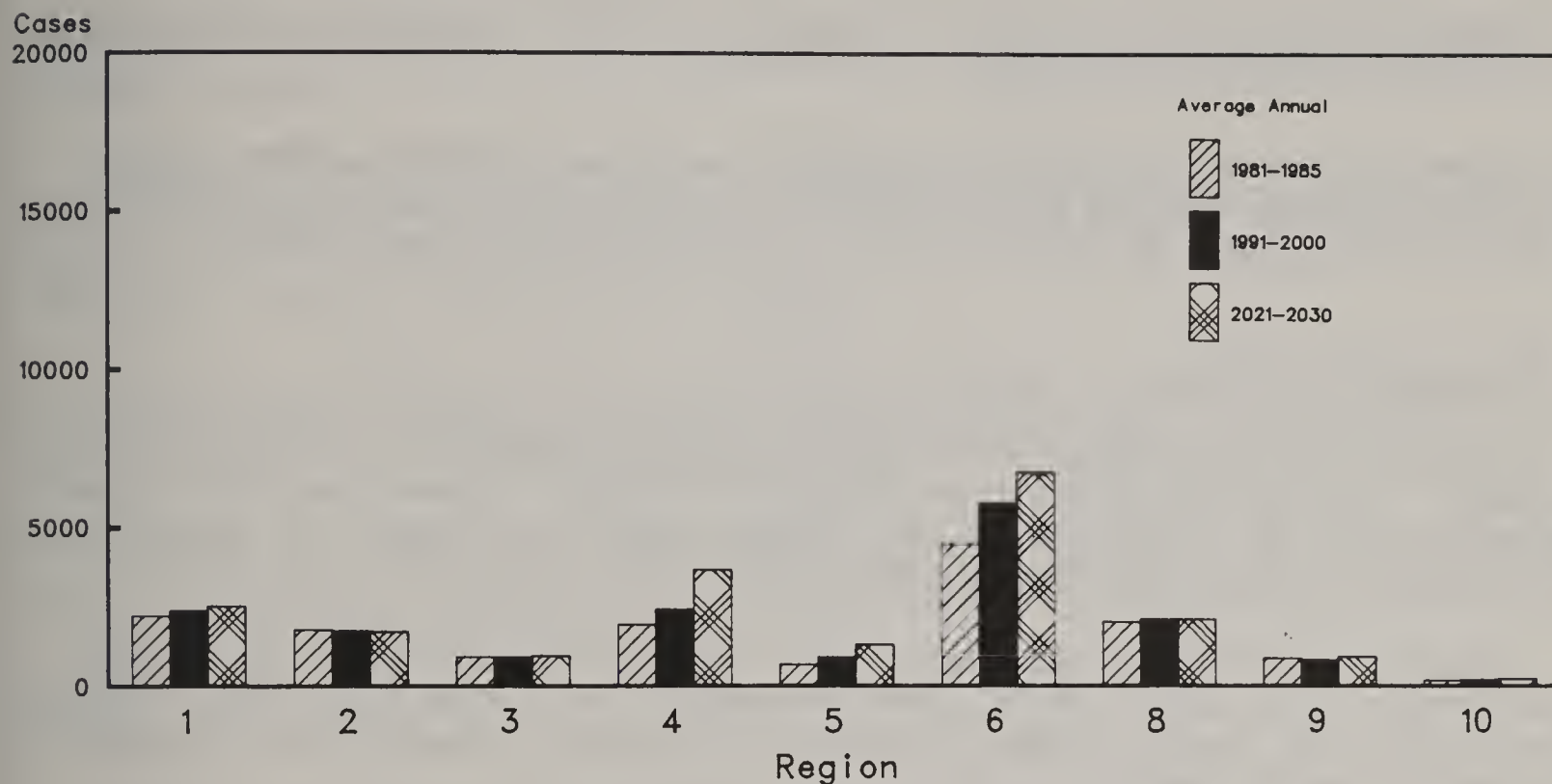
Programs to inform the public concerning mineral development improvements would not be contemplated.

Less information regarding mineral potential for planning purposes would be available.

Efforts to examine mineral claims for validity and for uses that constitute trespass would be limited. This limited action would address mainly flagrant violations of the mining laws.

Figure 3.55

Regional Estimates-Alternative 2 Mineral Leases and Permits (NFS)



State and Private Forestry.--Technical assistance to State forestry agencies and coordinating functions in mineral land reclamation on non-Federal lands would be minimal and confined to immediate and critical problems.

Research.--Research would evaluate the chemical and physical properties of mine wastes, identify potential pollutants, including heavy metals, and develop techniques for revegetation so that erosion would be minimized and streamflow water quality standards would be met. Associated undisturbed ecosystems and sites of ecological significance would be identified and techniques developed for their protection.

National Goals

Employment and training programs (NFS, S&PF, and Research).--Decrease level of involvement in employment and training programs for youth, older Americans, and the disadvantaged. Emphasize employment programs that help to protect and maintain NFS land and resources.

Urban and community forestry cooperation, S&PF.--Eliminate present cooperative urban forestry programs.

Urban and community forestry research.--Conduct limited effort to increase development and use of scientific knowledge to assess human benefits of urban forests, and to maintain, utilize, and protect urban forests.

Outputs and Activities

National Forest System.--Alternative 2 places emphasis on labor-intensive programs. These programs would be designed to cover a broad spectrum of our population with the objective of using their labor to protect and maintain the National Forest System lands and resources.

Program levels would decrease. Most of this decrease would be in the Youth Conservation Corps, while other programs such as the Young Adult Conservation Corps, the Senior Community Service Employment Program, and the Job Corps would remain stable.

State and Private Forestry.--Elimination of Federal financial and technical assistance to States and cities for urban and community forestry would reduce efforts to plan urban forestry programs, to maintain urban trees, to utilize wood from trees in urban areas, and to transfer results of research to the user. State and local governments would be required to find other sources of funds to carry out programs in high priority areas and to meet short-term critical needs.

Research.--Research would produce information on how urban and community forests improve property values, employment, and conservation of energy. Research would develop processes to plan, grow, improve, protect, maintain, and replace urban and community forests.

Protection

National Goals

Protection, NFS.--Provide low level of insect and disease management, fire management, and law-enforcement activities with emphasis on protection of watershed, facility, and community values.

Air Quality, NFS.--Provide a low level of air quality management, with emphasis on meeting prescribed standards and studying and managing air quality related values.

Cooperation with others, S&PF.--Provide a low level of technical assistance, cooperation, and cost sharing for insect and disease control. Eliminate technical and financial assistance for rural fire prevention and control, noxious weed control, and Dutch elm disease.

Insects, disease, and fire management systems research.--Maintain research programs and adapt current scientific knowledge and technology in insect, disease, and fire management systems.

Social, economic, and environmental effect research.--Maintain current research programs on methods to identify and assess impacts of insects, diseases, air pollutants, and fire.

Outputs and Activities

National Forest System.--Major fire protection efforts would be concentrated on the protection of high value resources, of watersheds, and wildland near urban areas. Fuels management efforts would be directed toward ensuring that activity created fuels are properly treated.

Fire management outputs on NFS lands are reflected in the Fire Management Effectiveness Index, which is a measure of the cost of protection plus the net damages per thousand acres protected. Estimates for the nine NFS Regions are shown in figure 3.57. Regional data are also shown for fuelbreaks and fuel treatments in figure 3.58.

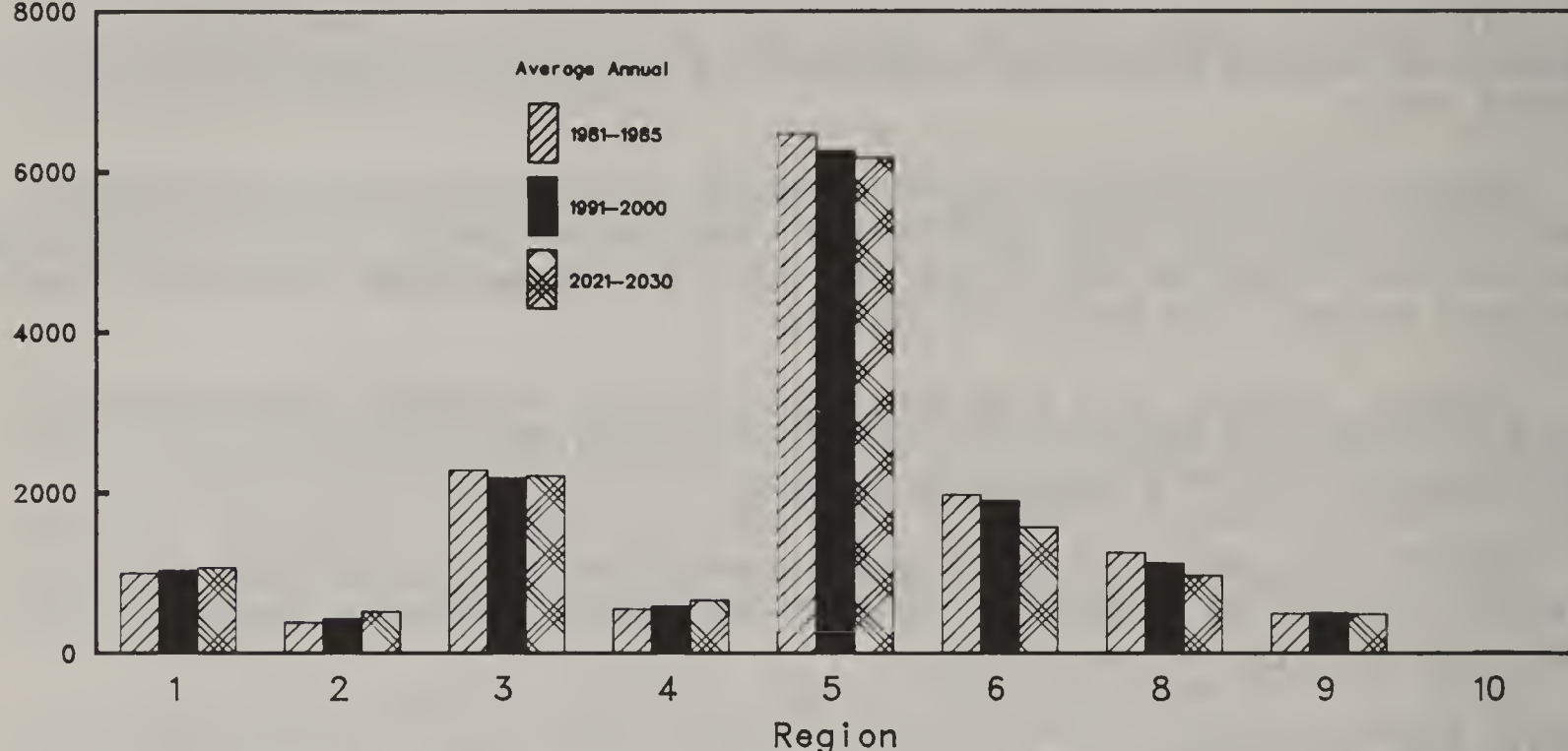
Significant aspects of Alternative 2:

- Overall index value is highest of any Alternative. Although it generally declines by the year 2030, the index value still exceeds all other Alternatives. Total operational and investment costs are the lowest of any Alternative, and suppression costs and damages are highest of any Alternative.
- Air quality management would be at a stewardship level. Particulates and gaseous emissions from NFS lands are highest of any Alternative because of relatively large wildfires expected.
- Insect and disease management would be performed at a submaintenance level with no new pilot projects, reduced technical assistance, and curtailment of major suppression efforts.
- Law enforcement efforts would be reduced to enforcement of laws and regulations whose violation would have a major adverse impact.

Figure 3.57

Regional Estimates-Alternative 2 Fire Management Effectiveness Index (NFS)

Dollars/Thousand Acres
8000

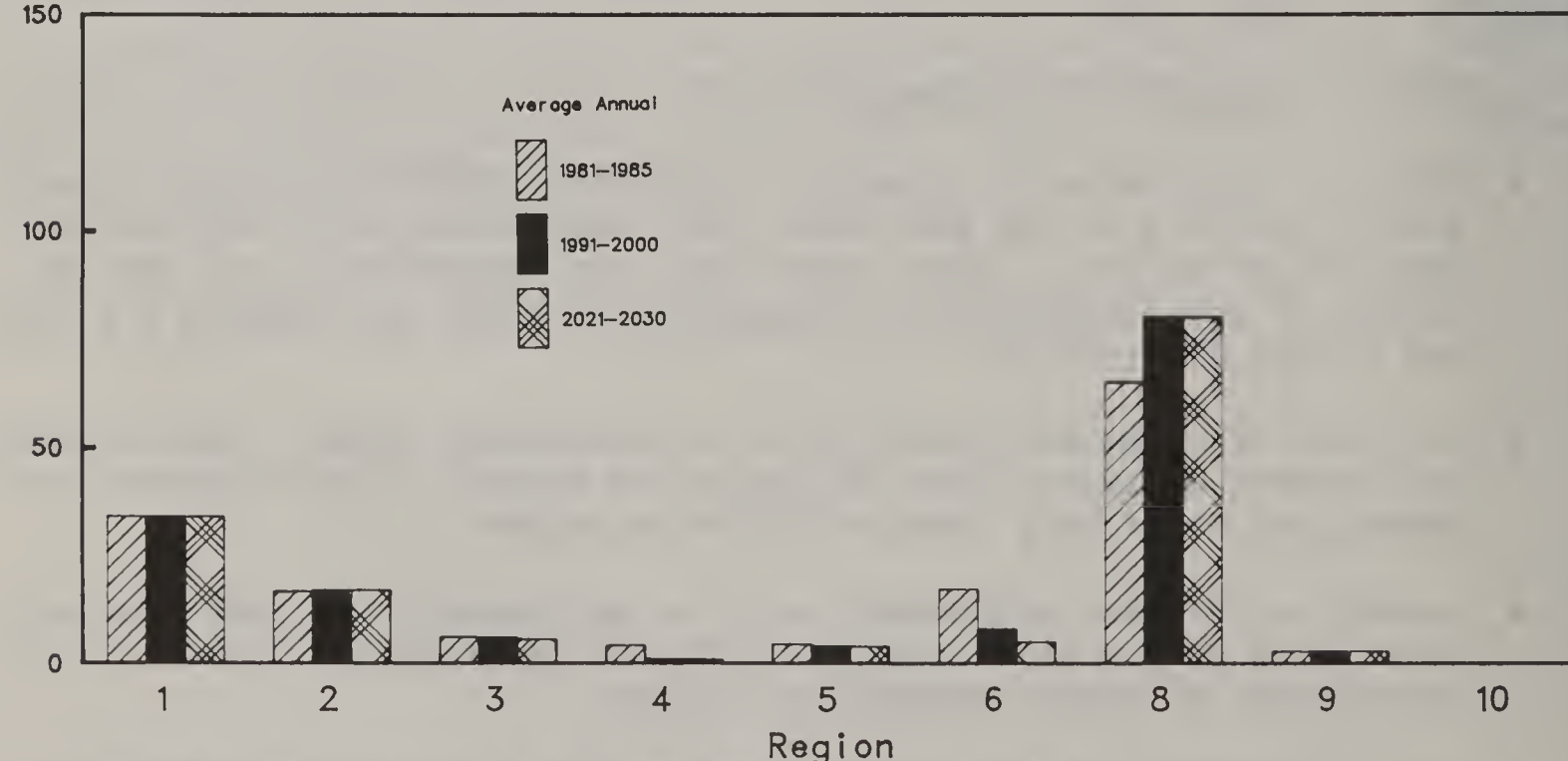


Fire Management Effectiveness Index is a Measure of Cost Plus Loss

Figure 3.58

Regional Estimates-Alternative 2 Fuelbreaks and Fuel Treatment (NFS)

Thousand Acres
150



Includes Fuelbreak Construction and Treatment of Natural Fuels.
Excludes Treatment of Activity Fuels.

State and Private Forestry.--Insect and disease control: Direct actions on National Forest System lands and cooperative actions on other public and private forest lands for insect and disease prevention, detection, evaluation and control would be significantly reduced. Regional variations in acres surveyed are illustrated in figure 3.59. Prevention activities and management plan inputs would be at a low level. Only the highest priority detection and evaluation surveys would be made. Few pilot, demonstration area, and loss assessment projects would be initiated. No new programs would be initiated, and no additional insect and disease specialists would be hired. Technical assistance and cost sharing with Federal and State land managers would be reduced to cover only the most critical insect and disease situations. The noxious farm weed control program and the Dutch elm disease program would be discontinued.

Rural fire prevention and control: Elimination of Federal financial and technical assistance to State forestry organizations would remove the Federal Government from any role in helping State Foresters or equivalent State officials obtain the goals outlined in their 1974 Fire Protection Analysis. States in which Federal funds now comprise only a small portion of total program financing could probably continue to provide current levels of fire protection. On the other hand, States which presently rely on Federal funds for up to 50 percent of their fire protection budget would be required to reevaluate their fire protection program in terms of overall State priorities.

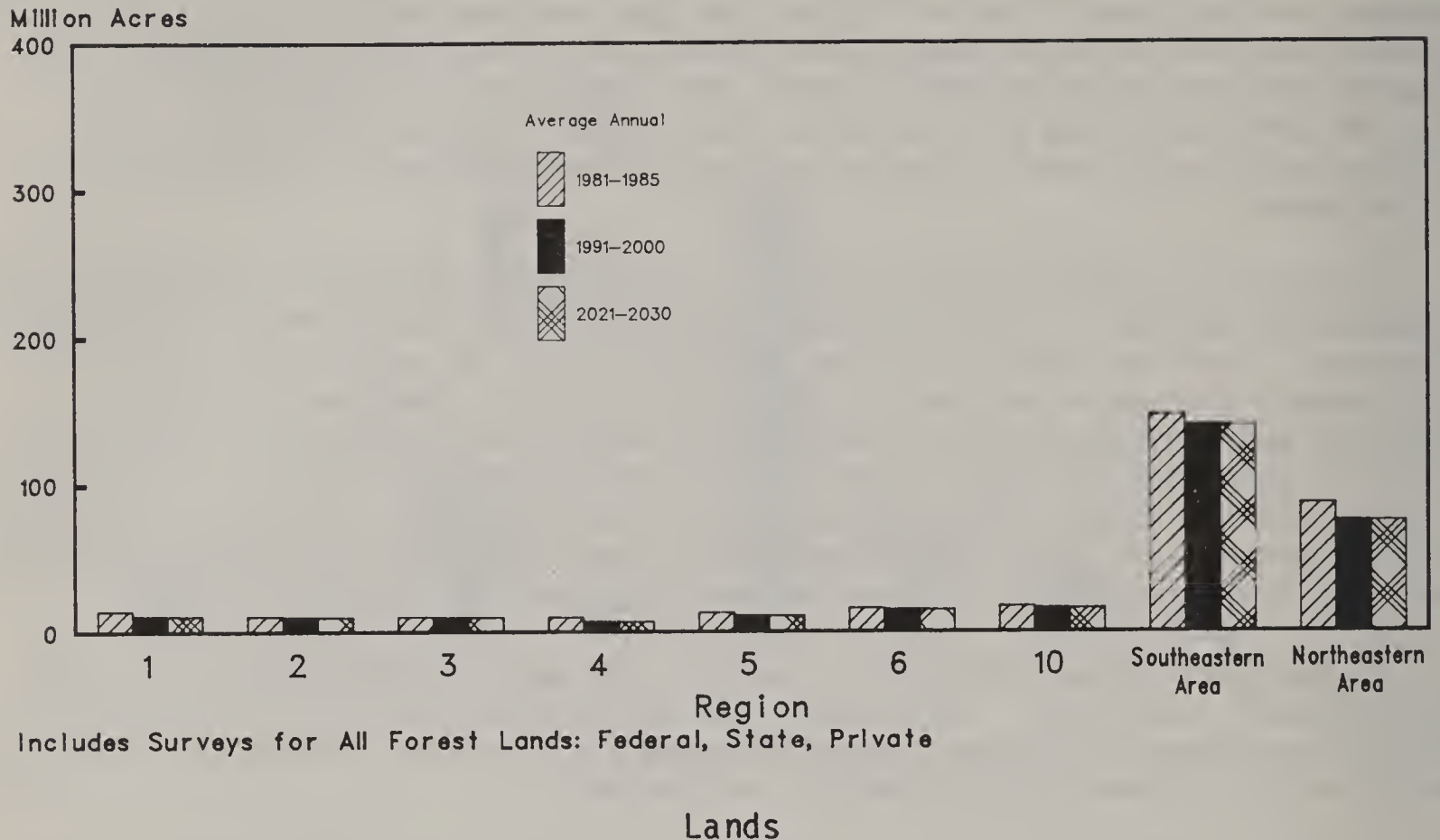
If decreased fire protection resulted, it would be detrimental to some environmental conditions. Decreased fire protection could also discourage private landowners from investing in management practices designed to produce wood fiber and other forest products and values.

Research.--Fire and atmospheric sciences research: Alternative 2 would concentrate on adapting current scientific knowledge and technology to provide the best possible fire management systems, strategies, and fire prevention techniques. Low-level research would be directed toward the fire problems of market and nonmarket commodities for the National Forest System and State and private forests.

Forest insects and disease research: Maintain current research programs on methods to identify and assess impact of insects and diseases commensurate with low-market and nonmarket outputs. Research would concentrate on identification of only the most destructive pests and their interaction with biotic and abiotic factors, and would be discontinued on predictive methods. Research and current knowledge on control methods would be adapted to pests of greatest importance, or efforts would be redirected in response to crisis situations. Research also would stress the development of safe chemical and biological controls. Minimum impact data bases would be maintained for evaluation of pest management systems.

Figure 3.59

Regional Estimates-Alternative 2 Insect and Disease Surveys (S&PF)



National Goals

Land management planning, NFS.--Limit land and resource management planning and related special studies to minimum mandatory requirements.

Land status, NFS.--Provide landline location, marking, title claims, and maintenance of land status records as needed to keep trespass at acceptable levels and to meet other minimum requirements. Limit land exchange and acquisition to resolve critical ownership problems. Facilitate early completion of Native and State land selections in Alaska.

Special land uses, NFS.--Limit efforts to plan and provide for special land uses.

Cooperation in State forest resource planning, S&PF.--Maintain a low level of cooperation and technical assistance to States for forest resources planning.

Forest resources economics research.--Utilize existing scientific knowledge to provide economic analyses needed for a minimum level of multiresource management.

Renewable resources evaluation research.--Maintain current timber inventory and analyses cycles and develop basic information for other renewable resources to meet broad planning requirements.

Outputs and Activities

National Forest System.--Land and resource management plans would be completed for all lands within the National Forest System by the mandatory October 1985 completion date. The intensity of planning would be held to that consistent with mandatory requirements and the needs of a low-level resource development program. Landline location, marking and status would be at the level needed to support low resource outputs and to discourage new and to resolve current trespass. Title claims activity would be minimal. Land purchases using Land and Water Conservation Funds would be at a high level until the program ends in 1989. Land purchases from regular (Weeks Act) funds would be minimal to acquire only the most critically needed parcels leaving the proportion of National Forest ownership in eastern National Forests much below optimum for efficient management. Land acquisition and exchange would generally be limited to levels necessary to meet legal requirements, such as those for national recreation areas, wild and scenic rivers, and archaeological sites. Acquisition and exchange for watershed protection would be at low levels. Other land exchanges and adjustments would be at minimum levels to resolve the most critical landownership problems (figure 3.62).

Special land uses are primarily externally imposed. Needs of others for special uses of National Forest System lands would increase as a result of increases in the national economy. Efforts would be limited to accommodate and manage only the most important uses. Existing uses would be managed to protect the public interest.

State and Private Forestry.--Maintenance of a low level of Federal financial, technical and related assistance to States for forest resource planning would provide little additional incentive to assemble, analyze, display, and report State forest resources data; to train State forest resources planners; or to consider forestry aspects during natural resources planning at the State and Federal levels.

Technical rather than financial assistance would be emphasized. Funds to employ, train, and support State forest resource planners or to contract for such services would be limited and available only on a priority case-by-case basis. Assistance would continue to be targeted to selected high-priority projects. State forest resource plans, dependent upon Federal assistance for development would likely be more general than under other Alternatives. Assistance for more detailed sub-State planning would be available only on a very limited basis.

Although direct Federal assistance to States would be at a low level, the Forest Service would continue to encourage coordination among State forest resource planning, National Forest System land management planning, and RPA.

Figure 3.63 illustrates, on a regional basis, the acreage for which State forest resources plans would be prepared. Figure 3.64 shows the acreage included in multiresource forest management plans prepared for individual landowners.

Research.--Forest resources economics research: Analyses would be based primarily on existing knowledge as required to provide economic data for minimum (stewardship) level of resource management and outputs from all Federal, State, and private forest and range lands. Costs and benefits resulting from

Figure 3.62

Regional Estimates-Alternative 2 Land Purchase and Acquisition (NFS)

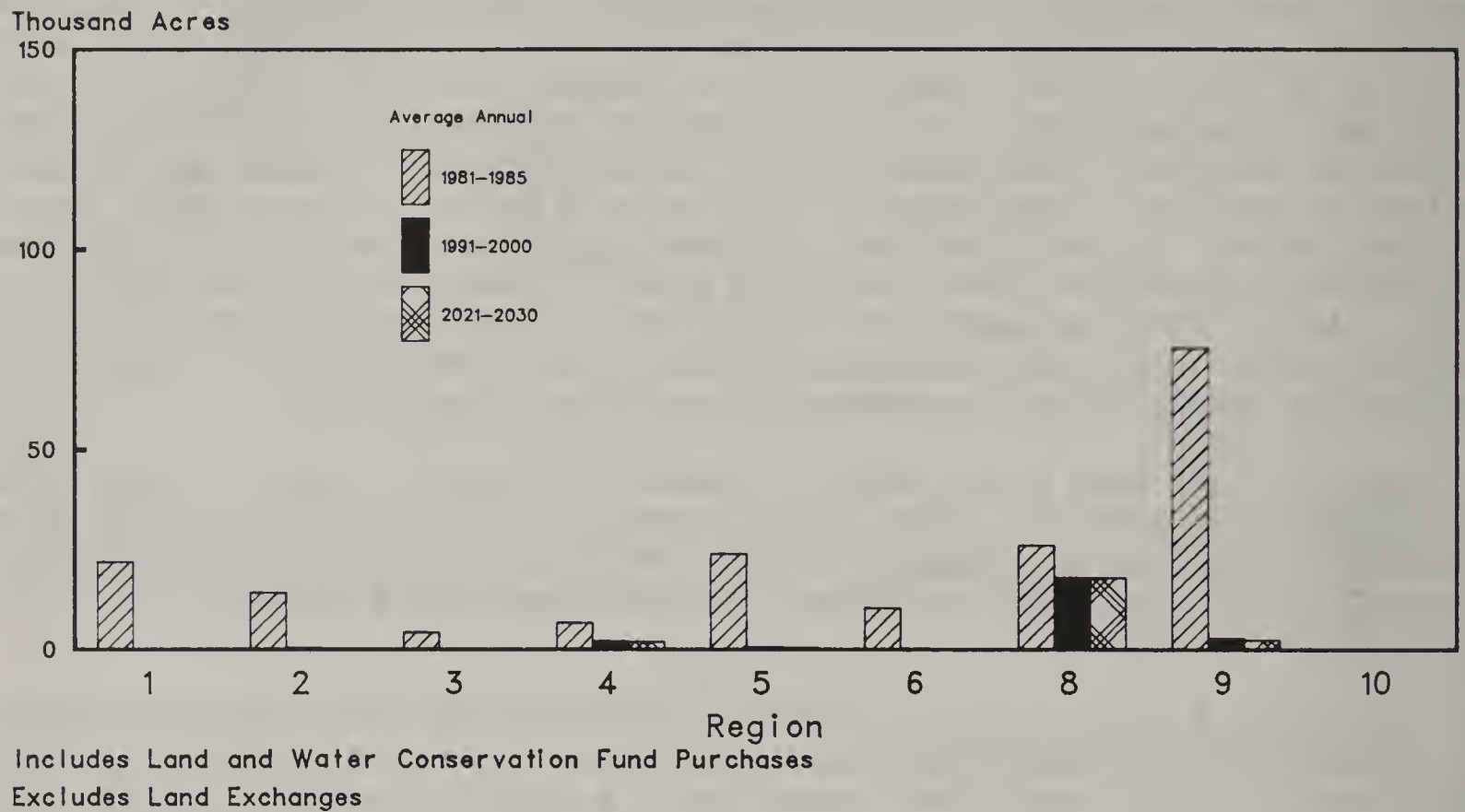
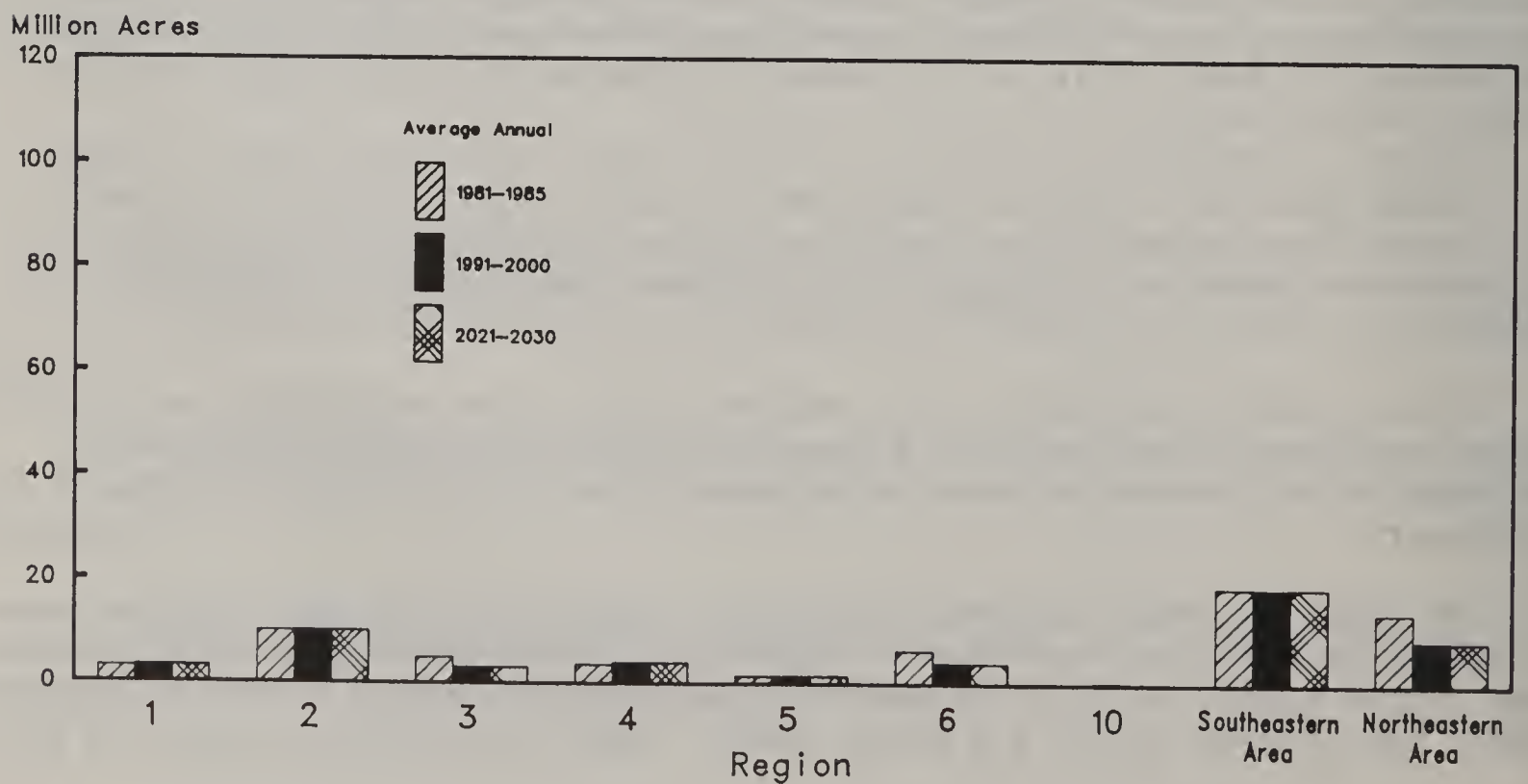


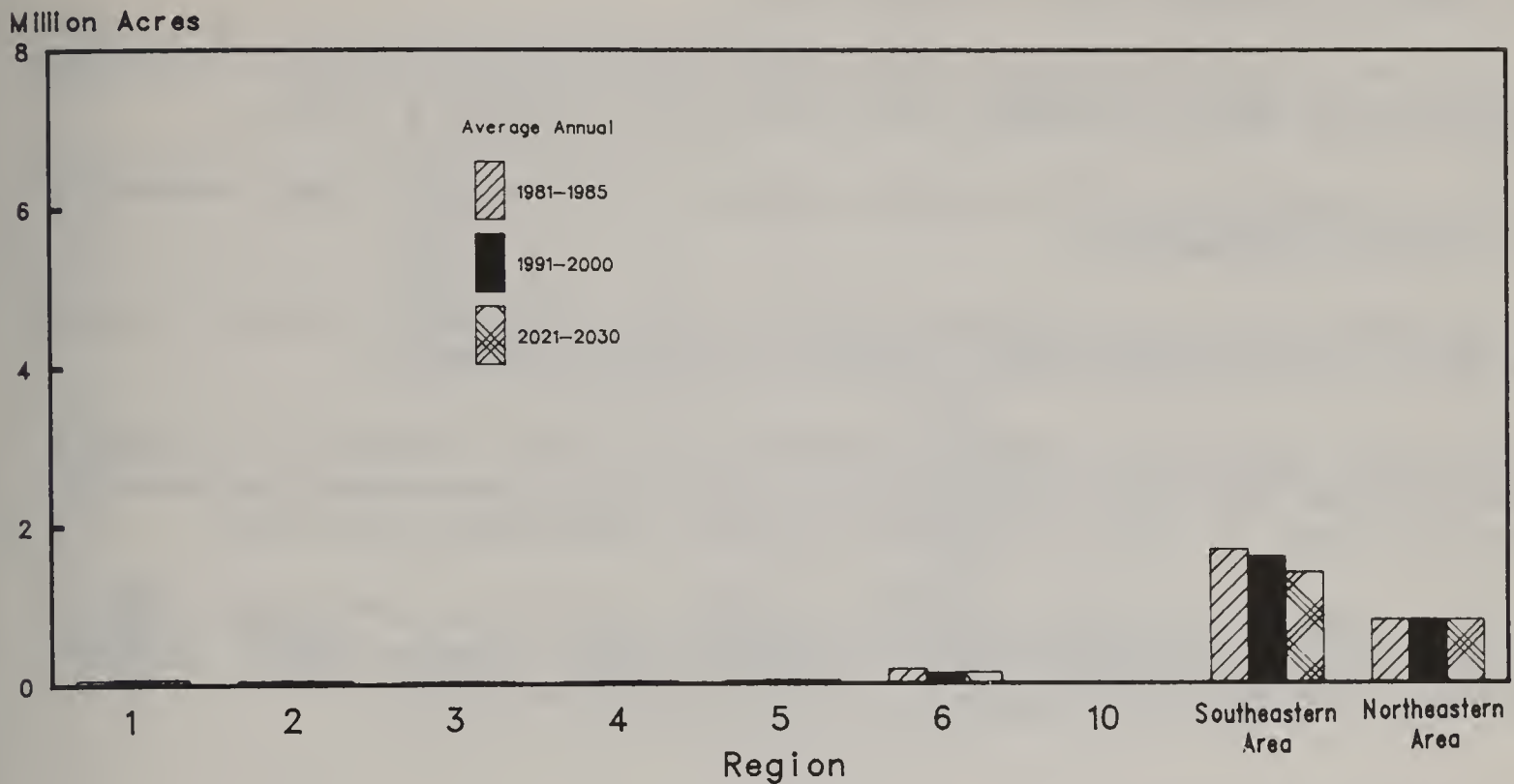
Figure 3.63

Regional Estimates-Alternative 2 State Forest Resource Planning (S&PF)



Regional Estimates-Alternative 2

Landowner Forest Management Plans (S&PF)



alternative land management practices would be determined for a limited variety of forest types.

Renewable resources evaluation research: Inventories and analyses of timber would be conducted by present methods and sampling standards. Timber inventories would be maintained at current intensity and current cycles which provide data for large volumes on broad areas of commercial timberland. General information would be sought on the amount, condition, and other resources needed for minimum level of resource management and broad planning requirements.

Soils

National Goals

Technical soil support services, NFS.--Limit technical soil services to those needed to maintain soil productivity.

Soil resource improvement, NFS.--Limit implementation of soil resource improvements to those necessary to maintain basic resource values.

Soil inventories, NFS.--Provide only the soil inventory data needed for basic resource protection.

Abandoned mineland reclamation, NFS.--Limit reclamation efforts to areas where there are important public health and safety problems.

Technical assistance, S&PF.--Provide only limited technical assistance and training in soil data interpretations for forest management purposes on high value areas in cooperation with the Soil Conservation Service.

Soil management research.--Limit research effort to development and use of scientific knowledge about soil to maintain basic protection of soil productivity and to prevent regression of watershed conditions.

Outputs and Activities

National Forest System.--Soil activities in this element would exceed the support services required to maintain soil productivity and to provide for nondegradation of the soil resources due to other resource activities. The detail and quantity of soil resource inventories would decrease with decreasing resource outputs. Improvements would be limited to damaged soils to return them to natural productivity and prevent further deterioration (figure 3.65). Resource improvement maintenance would be decreased because of limited levels of resource improvement.

State and Private Forestry.--Technical assistance and training in soil data interpretations for forest management purposes would be available only on a very limited incidental basis and only as needed for soil resource protection in high-value areas.

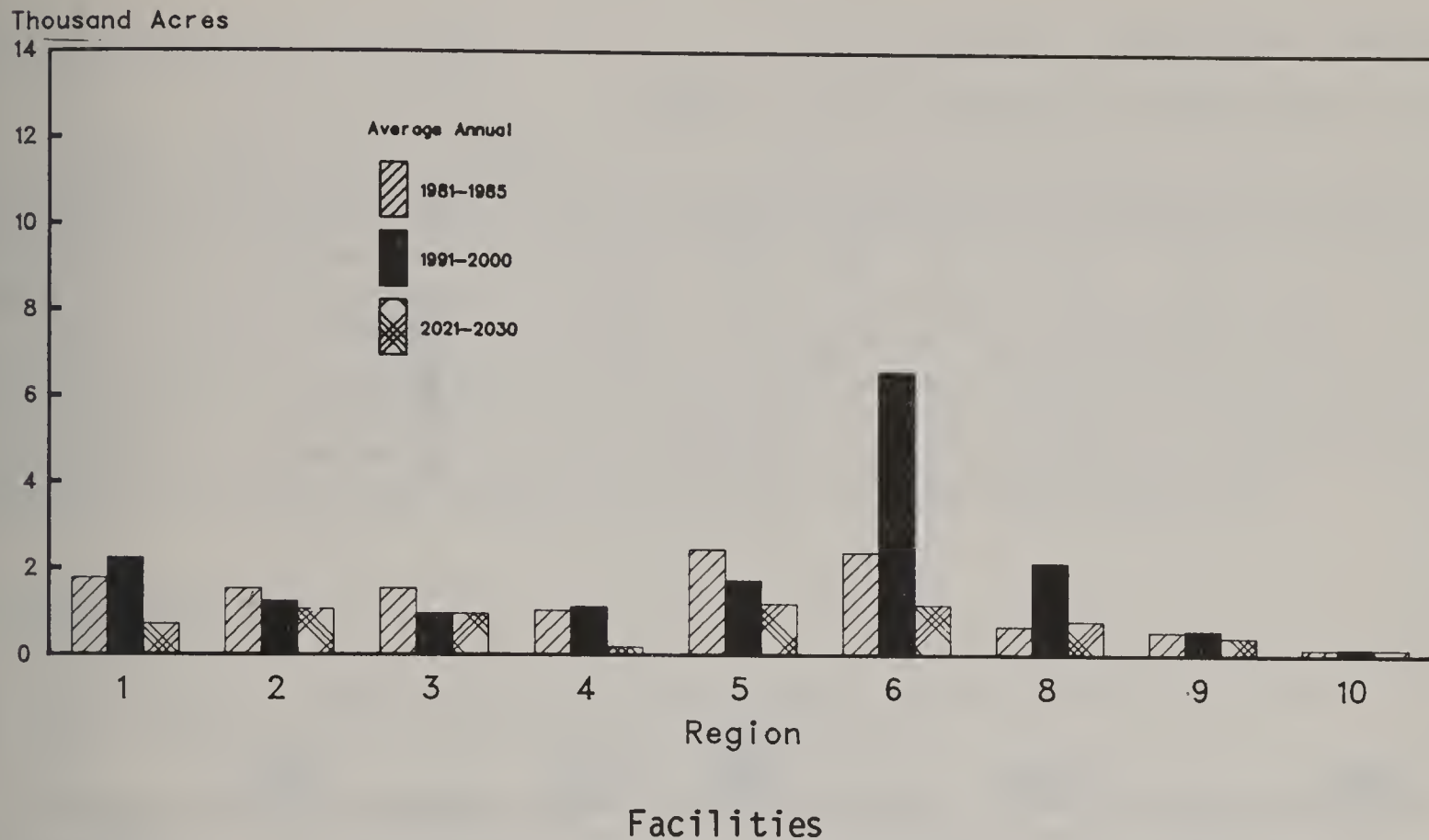
No cooperative technical assistance for prime forest land mapping would be provided. Any such mapping done with Federal assistance would be accomplished under the limited forest resource planning program in the lands element.

Research.--Research would determine the soil requirements for recreation sites and wildlife habitats. Techniques would be developed to reduce soil erosion to maintain terrestrial ecosystems, and improve streamflow water quality to maintain aquatic ecosystems.

Figure 3.65

Regional Estimates-Alternative 2

Soil and Water Quality Improvement (NFS)



National Goals

Utility systems, NFS.--Phase out installation of utility systems providing service above that required for a basic protection program. Close down systems now serving intensive management programs.

Building construction, NFS.--Limit construction of buildings to replacements needed for health and safety, and equal opportunity.

Building maintenance, NFS.--Maintain buildings needed for resource protection to current health and safety standards. Continue conversion for energy conservation.

Communications, NFS.--Replace systems only when maintenance becomes more expensive than replacement.

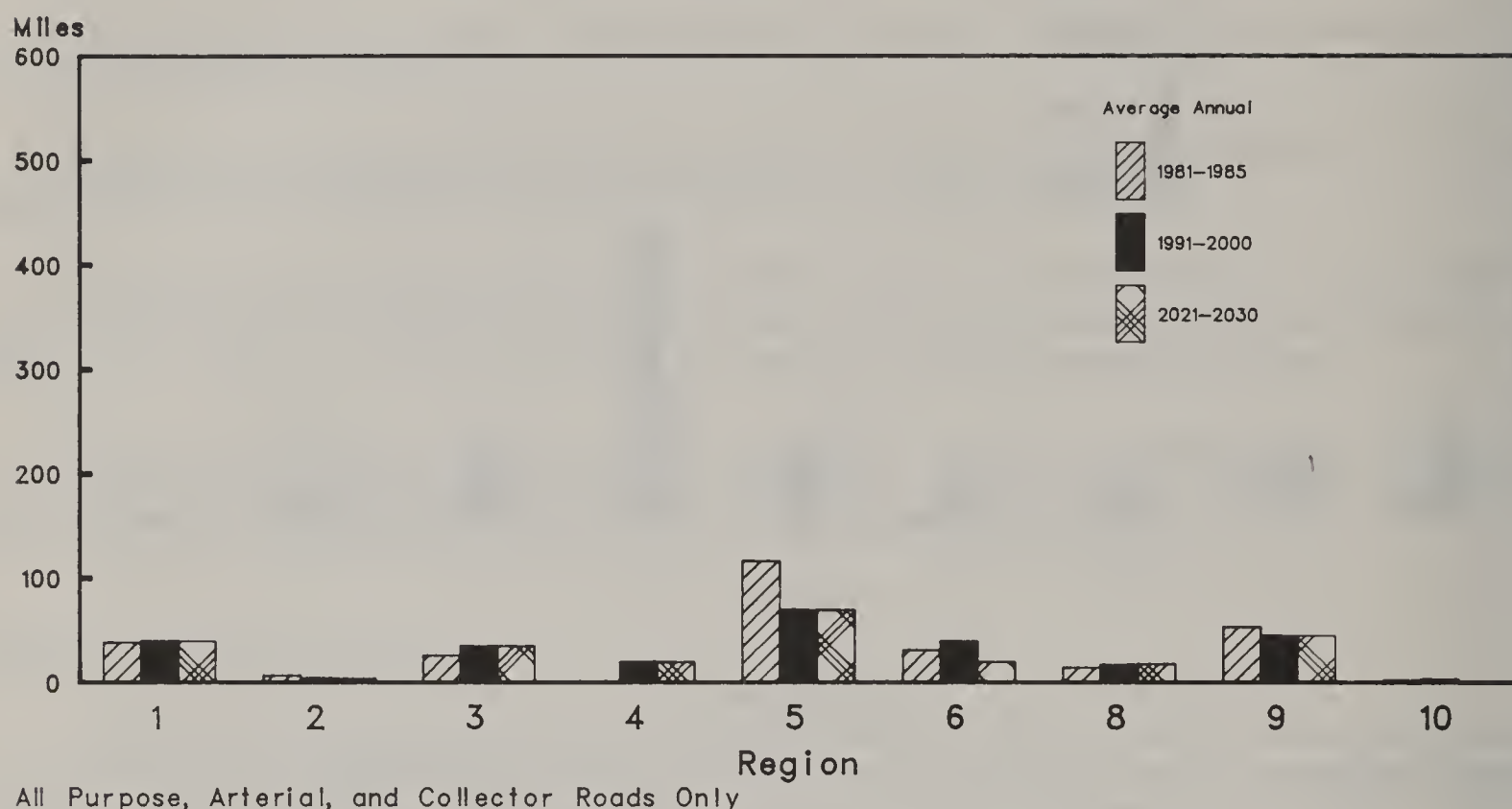
Transportation including roads and trails construction, NFS.--Phase out installation of principal land-based transportation networks to access currently roadless intensive management forest land areas. Close current access to land area with critical soil and watershed instability. Limit access by air and water to protection and maintenance requirements.

Water impoundments, NFS.--Phase out installation of water impoundments. Close down impoundments requiring major restoration to meet safety standards. Limit minor restoration to impoundments essential to resource protection.

Research construction.--Limit construction of new research laboratories to those of highest priority. Continue conversion for energy conservation.

Figure 3.66

Regional Estimates-Alternative 2 Road Construction/Reconstruction (NFS)



Outputs and Activities

National Forest System.--Minimum capital investments would be made in new facilities. Reconstruction, operation, and maintenance programs would be based on analysis of closing and disinvesting where custodial maintenance is cost effective and efficient in resource protection. The physical plant now in existence would be analyzed in relation to areas to be managed for use and production, versus areas to be held in reserve in a protected state with minimal active management. Facilities in areas where production and use were controlled and/or eliminated would receive only the investment and maintenance necessary to protect public health and safety. Minimum cost alternatives would be chosen wherever possible including disinvestment, abandonment, or disposal of real property. Regional effects would be in areas of sensitive ecosystems or older facilities where maintenance and replacement are costly and where management systems are withdrawn. The Appalachians, Rocky Mountains, and Southwest could be heavily affected as could eastside areas of the Pacific Northwest, and Northern Regions. Figure 3.66 represents a phasing out of the construction of the principal regional transportation systems.

Research.--Construction of new research laboratories would be limited to those of highest priority.

Environmental Effects

The environmental effects of this Alternative--physical-biological, economic, and social--are summarized on the following pages. For a more detailed description of these effects, see chapter 4.

Physical-Biological Effects

Under Alternative 2, water quality goals would be met with no increase in yield over the present condition. Air quality would increase in the short-term but have the potential for long-term reductions as a result of natural fuel buildups which would cause more and larger wildfires. Visual quality would be least impacted and retain present degree of naturalness, but decrease in the long-term in terms of variety and opportunities for enhancement. Of the endangered and threatened species, most would be maintained and three would decline. Most of the other management indicator species would also be maintained or decline in this Alternative. Cultural resource protection and identification would be reduced and result in increased vandalism.

Economic Effects

Over the 50 years, the present net worth for Alternative 2 is \$44.9 billion discounted at 7-1/8 percent (table 3.8).

The largest net benefits of resource elements are in timber and water. Together these elements account for about 65 percent of the present net worth. Other resource elements having sizeable positive values are Recreation, minerals, and wildlife and fish. No resource elements have negative values.

All Regions have a positive present net worth. Over 56 percent of the value is contributed by the Pacific Coast (Regions 6 and 5).

All Regions have positive values in the recreation, wilderness, wildlife and fish, and water resource elements. The Pacific Southwest (Region 5) and the South (Region 8) contribute over 52 percent of the recreation value (33 and 19 percent, respectively). Also, Region 2 of the Rocky Mountains and the Pacific Southwest (Region 5) contribute over 62 percent of the wilderness value (30 and 32 percent, respectively). Region 1 of the Rocky Mountains contributes over 34 percent of the value in the water element.

The timber programs on the Pacific Coast (Regions 6 and 5) are responsible for the large positive values in timber. The net value for all other Regions added together is negative in this Alternative.

Regions 2, 3, and 4 of the Rocky Mountains contribute over 77 percent of the mineral values. These values come mostly from energy-related minerals.

Table 3.8.--NFS present net worth for Alternative 2
discounted at 7-1/8 percent by resource element & region

(Million dollars)

Element	NFS Regions									Total by Element
	1	2	3	4	5	6	8	9	10	
Recreation	173	851	407	478	2,465	835	1,428	828	85	7,550
Wilderness	36	358	55	93	381	72	26	147	13	1,181
Wildlife & Fish	216	597	471	360	329	506	324	397	231	3,431
Range	44	119	76	-22	28	2	1	-6	-	242
Timber	172	-141	85	-12	3,467	13,944	-53	-319	-545	16,570
Water	4,207	1,321	176	1,854	1,478	1,569	361	104	1,370	12,440
Minerals	95	1,292	245	1,139	10	-27	87	234	595	3,480
Total by Region	4,753	4,397	1,515	3,890	8,158	16,901	2,174	1,385	1,749	44,894

1/ Value for locatable materials other than uranium and thorium was not determined.
This primarily impacts the values in Region 5.

Returns to Government.--Returns to government expected from gross sale (or Tease) of National Forest System resources for Alternative 2 are \$1,482 million in 1981, \$1,852 million in 1985, \$2,335 million in 1995, and \$4,125 million in 2025.

These returns include cash payments, required deposits from purchasers to finance activities resulting from timber sales (such as Knutson-Vandenberg deposits), and credits allowed for work performed by the purchasers.

The Alternative 2 annual revenues (returns to government in either dollars or credits) are as follows:

(Million dollars)				
Activity	1981	1985	1995	2025
Recreation	14	14	12	11
Grazing	23	17	17	12
Timber	1,290	1,572	1,920	3,380
Minerals NFF <u>1/</u>	20	27	34	51
	-----	-----	-----	-----
Total NFF <u>2/</u>	1,347	1,630	1,983	3,454
Minerals, BLM <u>3/</u>	135	222	352	671
	-----	-----	-----	-----
Total Government	1,482	1,852	2,335	4,125

1/ (NFF) National Forest Fund.

2/ Historically, approximately 25 percent of the National Forest receipts have been paid to States for redistribution to local county governments. Payments are also made by BLM. These payments are in lieu of taxes.

3/ Mineral royalties collected from public domain National Forest System Lands and reported by Bureau of Land Management.

Social Effects

The effects of Alternative 2 on the existing social structure would be significant in comparison with the effects of the other Alternatives. The overall magnitude nationally could be significant, with especially large effects expected regionally and locally where nonmetropolitan areas are dependent on Forest Service program outputs and services. These include large areas of the West and South and some areas in the North. The key social variables most affected would include population, community economics, housing, community identity, and minority opportunities. Some effects from this Alternative would be mitigated in areas with rapid growth and associated change caused by factors other than Forest Service programs.

ALTERNATIVE PROGRAM DIRECTION 3

(Forest Service programs would provide moderate amounts of market and nonmarket outputs on National Forests, State and private forest and range lands.)

Alternative 3 is a continuation of the 1975 Program, with adjustments to reflect changes since 1975.

Program in Brief

National Forests

For this Alternative, emphasis is focused on four areas:

1. Dispersed recreational opportunities would be emphasized, along with a moderate allocation of National Forest land to statutory wilderness designation.
2. Timber and range activities would place priority on the most cost-effective resource management and investment opportunities on all lands.
3. Wildlife and fish habitat improvement, land and water stewardship, and human and community development would be accelerated.
4. Minerals activities would place priority on the most cost-effective energy investment opportunities on all lands.

Alternative Program 3 concentrates timber and range production investments where benefits are commensurate with costs. It enhances the environment and wildlife habitat on all forest and range lands regardless of ownership. It also emphasizes management and use of the National Forests for congressionally designated wilderness and dispersed recreation, leaving increases in developed recreation to State and private lands.

State and Private Forestry

State and Private Forestry programs would provide moderate levels of financial and technical assistance through State forestry agencies for moderate assistance would approximate projections in the 1975 Recommended Program and would be generally larger than under current trends.

Timber production for Alternative 3 stresses increased investments, services, and use of Research results. Strong efforts would be made to encourage nonindustrial landowners to improve protection, development, management, and utilization of their timber resources.

Research

For Alternative 3, the research program would focus on providing a more adequate scientific basis for improved management practices for all forest and range resources while minimizing adverse environmental impacts. Research would be expanded on nonpoint-source water pollution, resource inventory and evaluation, reclamation of mined and eroded sites, resource economics, insect and disease control, and intensive culture of important timber species. Research programs, including efforts with cooperating universities and agencies, would be designed to solve problems related to both the public and private forest and range lands. The national and regional programs of Research were developed based on this Alternative as a continuation of the 1975 Recommended Program.

Human Resource Development

Alternative 3 would continue Forest Service involvement in this area, and even increase activities in some instances. The programs emphasized would be those which are most closely related to natural resource management and development, including conservation education.

Summary of Program Outputs, Activities, and Costs

Under Alternative 3, the supply of recreation opportunities on the National Forest System would increase moderately. Use would increase from 210 million visitor days in 1978 to 362 million in 2025, excluding wilderness use. Cooperative assistance for dispersed recreation and scenic values would be moderately increased.

A moderate increase of National Forest System acres of designated wilderness would be recommended, beyond the acreage now existing, proposed, endorsed, or under study.

On the National Forest System, wildlife habitat improvements would increase from 2.3 million acre-equivalents in 1978 to 3.1 million in 1985. Anadromous fish habitat improvements would increase the annual contribution of the National Forests to the commercial salmon fishery by 3.8 million pounds in 1985 and 25.5 million pounds by 2005 through 2025. Cooperative assistance for wildlife and fish habitat improvements on non-Federal forest lands would be moderately increased by encouraging such objectives in landowners' multi-resource management plans.

Livestock grazing on the National Forest System would increase from the present 9.9 million animal unit months to 13.2 million in 2025. Cooperative assistance for forage production on non-Federal forested ranges would be moderately increased.

National Grassland management would place priority on the most cost effective resource management and investment opportunities to demonstrate sound and practical principles of land use, and to exert a favorable influence for securing sound land conservation practices on associated private lands, to help assure moderate-level market and nonmarket outputs on both the Federal and private lands.

Timber sale offerings from the National Forest System would increase from 12.2 billion board feet in 1978 to 16.4 billion by 2025. Annual reforestation would increase from 414,000 acres in 1988 to 476,000 by 2025. Cooperative assistance programs would be increased moderately, and would include proper sale, harvest and processing techniques, as well as increased and improved timber growth.

Water quantity and the percentage of water currently meeting water quality goals would increase slightly. Cooperative assistance for protecting and improving the quality, quantity, and timing of water yields from non-Federal forest lands would increase moderately.

Efforts would be moderately increased to accommodate all requests to prospect for, develop, and remove mineral resources from National Forest System lands in compliance with all applicable laws. The number of applications for leases and permits is expected to increase from 17,882 in 1981 to 35,400 by 2025. Cooperative assistance to State forestry agencies for reclamation of surface mined lands would be provided at a moderate level.

Research will emphasize production of knowledge and technology needed to manage all resources on both public and private forest and rangelands. Research requirements to support these needs are described in the Regional and National Programs for Research. 1/

Human and community development programs on the National Forest System would be slightly larger than the FY 1978 programs. Cooperative assistance to States and cities for urban and community forestry would increase moderately.

The total Forest Service work force, in thousand person-years, necessary to perform the work included in Alternative 3 is as follows:

Base Year						1986-	1991-	2001	2011-	2021-
1978	1981	1982	1983	1984	1985	1990	2000	2010	2020	2030
44.4	73.3	75.7	77.7	79.7	80.2	75.5	73.4	77.2	78.9	80.7

Table 3.9 displays a national summary of the National Forest System projected program outputs, activities, costs and returns to the Government for Alternative 3. Table 3.10 shows comparable data for State and Private Forestry programs. Table 3.11 summarizes the Research program. Costs by program area for Alternative 3 are shown in figure 3.67.

1/ U.S. Department of Agriculture, and National Association of State Universities and Land Grant Colleges. National program of research for forests and associated rangelands. August 1978. (Western, North Central, North-eastern and Southern Region publications; August 1978).

**Table 3.9.--Projected National Forest System program outputs, activities,
and costs 1/**

PROGRAM ELEMENT AND OUTPUT/ACTIVITY	UNIT OF MEASURE	BASE YEAR 1978	ANNUAL UNITS									
			1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
RECREATION												
Developed Recreation Use (Includes VIS)	Million Recreation Visitor Days	79.6	86.4	91.7	95.4	101.0	104.4	110.3	123.1	131.5	143.2	151.8
Dispersed Recreation Use (Includes Wild- life & Fish)	Million Recreation Visitor Days	130.2	136.3	138.5	140.4	143.6	146.7	154.6	171.8	188.0	199.1	210.6
Trail Construction/ Reconstruction	Miles	600	2500	2200	2100	2000	2100	2200	2200	2100	2100	2100
WILDERNESS												
Wilderness Management	Million Acres	15.3	32.3	34.3	35.1	35.6	36.2	36.7	36.9	37.0	37.2	37.3
WILDLIFE & FISH												
Wildlife Habitat Improvement	Thousand Acre- Equivalents	2330	3120	2940	3000	3030	3090	2940	2590	2100	1430	1400
Anadromous Fish Improvement	Thousand Pounds	--	3	210	581	1680	3750	9680	19590	25490	25490	25490
RANGE												
Grazing Use (Live- stock)	Million Animal- Unit Months	9.9	10.1	10.1	10.2	10.3	10.4	10.7	11.1	11.6	12.5	13.2
TIMBER												
Programmed Sales Offered	Billion Board Feet	12.2	11.9	11.9	12.2	12.3	12.4	12.8	13.5	14.8	15.6	16.4
Reforestation	Thousand Acres	411	447	486	495	507	506	414	427	443	457	476
Timber Stand Improvement	Thousand Acres	420	433	466	455	444	436	406	426	454	463	469
WATER												
Volume Meeting Water Quality Goals	Million Acre Feet	--	402	404	405	407	408	411	418	421	421	421
MINERALS												
Minerals Leases and Permits	Thousand Operating Plans	14.5	17.9	19.9	21.1	22.5	23.7	26.0	28.1	30.8	34.5	35.4
HUMAN & COMMUNITY DEVELOPMENT												
Human Resources Programs 2/	Thousand Enrollee Years	14.8	16.7	18.5	18.5	18.5	18.5	9.6	9.6	9.6	9.6	9.6
PROTECTION												
Fire Management Effectiveness Index	Dollars/ Thousand Acres	1110	1280	1300	1300	1300	1280	1250	1260	1260	1230	1200
Fuelbreaks & Fuel Treatment	Thousand Acres	392	286	327	348	350	355	365	356	350	346	346
LANDS												
Land Purchase and Acquisition (Excludes Exchange)	Thousand Acres	117	236	222	221	204	220	368	95	123	151	165
SOILS												
Soil & Water Resource Improvement (Improved Watershed Condition)	Thousand Acres		28.4	31.2	32.6	33.8	35.2	35.5	32.0	27.6	27.9	27.9
FACILITIES												
Road Construction/ Reconstruction (Arterial, Collector)	Miles	686	476	649	712	759	796	1140	1250	1270	505	469
RETURNS TO THE GOVERNMENT												
	Million Dollars		1112	1106	1216	1298	1378	1536	1784	2284	3022	3820
COSTS												
NATIONAL FOREST SYSTEM-												
Operational	Million Dollars	676	3/ 847	956	982	1008	1016	1062	1129	1208	1230	1265
Capital Investments 4/	Million Dollars	684	1007	972	1023	1075	1100	992	1101	1158	1173	1185
Backlog 5/	Million Dollars	61	48	56	58	58	48	32	29	--	--	--
Total Appropriated 6/	Million Dollars	1421	1902	1984	2063	2141	2164	2086	2259	2366	2403	2450
Allocated Funds 7/	Million Dollars	244	369	370	370	372	373	270	4	4	4	4
Total NFS	Million Dollars	1665	2271	2354	2433	2513	2537	2356	2263	2370	2407	2454

1/ All costs and returns are shown in constant 1978 dollars.

2/ Human Resource Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

3/ The 1978 base year figure has been adjusted upward in order to include the effect of the revised fire financing policy which calls for full funding of presuppression activities instead of relying on supplemental appropriations. The amount of the adjustment (92.4) is from the 1979 President's Budget.

4/ NFS capital investments are such things as: sale preparation--live volume; TSI/reforestation; range structural improvements; road and trail construction/reconstruction; wildlife and fish habitat improvement; developed recreation site construction; water and soil resource improvements; and fuel treatments.

5/ Backlog costs are shown here for information only and are included in capital investment costs.

6/ Total appropriated costs are the sum of operational and capital investment costs. NFS appropriated funds include all YCC and Cooperator Funds.

7/ NFS allocated costs include YACC and other human resource programs, O&C Grants, Land and Water Conservation, and other funds. Costs exclude payments to States and Counties, and Federal Highway Funds.

Abbreviations used: AUM = animal unit month; RVD = recreation visitor day.

Table 3.10.--Projected State & Private Forestry program outputs, activities, and costs 1/

PROGRAM ELEMENT AND OUTPUT/ACTIVITY	UNIT OF MEASURE	BASE YEAR 1978	1981	1982	1983	1984	1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
RECREATION												
Technical Assistance for Dispersed Recreation	Thousand Acres	81	172	179	188	215	241	283	399	468	529	541
WILDLIFE & FISH												
Technical Assistance for Wildlife Habitat Improvement	Thousand Acres	170	191	205	220	234	249	274	337	415	476	524
RANGE												
Technical Assistance for Range Improvement	Thousand Acres	50	110	122	140	148	168	192	252	274	296	329
TIMBER												
Reforestation (RFA, FIP, ACP)	Thousand Acres	326	738	775	802	825	866	894	959	1020	1070	1100
Timber Stand Improvement (RFA, FIP, ACP)	Thousand Acres	275	578	595	619	640	658	712	818	887	949	1010
Timber Prepared for Harvest	Million Cubic Feet (MMCF)	225	281	299	306	316	323	317	305	314	321	327
Woodland Owners Assisted	Thousand Owners	165	241	253	278	285	288	297	321	337	350	358
Improved Wood Utilization	Million Cubic Feet (MMCF)	164	204	207	211	215	219	228	248	259	279	295
HUMAN AND COMMUNITY DEVELOPMENT												
Urban and Community Forestry	Thousand Urban Areas	7.0	2.8	3.3	3.8	3.8	3.9	4.2	5.0	5.7	5.8	5.8
PROTECTION												
Insect and Disease Surveys	Million Acres	600	448	492	538	577	618	616	648	677	677	677
Rural Community Fire Protection	Thousand Approved Applications	3.0	3.5	4.1	4.1	4.2	4.2	4.3	4.1	4.2	4.3	4.4
Fire Loss on Protected Area	Thousand Acres Burned	1700	2/1800	1790	1780	1760	1720	1750	1670	1720	1570	1460
WATER, MINERALS, LANDS, AND SOILS												
State Forest Resource Planning	Million Acres	--	162	107	189	147	149	169	174	173	176	176
Landowner Forest Management Plans	Million Acres	3.2	4.1	4.3	4.3	4.5	4.5	4.7	5.1	6.4	7.2	7.9
Cooperative Technical Assistance	Person Years	--	66	60	64	65	66	65	62	64	65	67
COSTS												
STATE AND PRIVATE FORESTRY-												
Operational	Million Dollars	30	44	48	48	48	48	53	56	60	63	65
Capital Investments 3/	Million Dollars	50	70	78	78	78	78	83	86	93	93	97
Total Appropriated 4/	Million Dollars	80	114	126	126	126	126	136	142	153	156	162
Allocated 5/	Million Dollars	37	66	75	75	75	75	61	65	68	73	77
Total S&PF	Million Dollars	117	180	201	201	201	201	197	207	221	229	239

1/ All costs are shown in constant 1978 dollars.

2/ S&PF-Cooperative Fire Loss base figure is calendar year 1977.

3/ S&PF capital investments include such activities as: reforestation; timber stand improvement; preparation of landowner forest management plans; cooperative forest resource planning; insect and disease surveys; and fire management planning and fuel treatment.

4/ Projected estimates of funds appropriated to the Forest Service for cooperative forestry assistance under P.L. 95-313.

5/ Projected estimates of funds appropriated to other USDA agencies for programs which receive assistance from the Forest Service and State forestry agencies, including (1) forestry practices under the Agriculture Conservation Program and the Forestry Incentives Program funded through the Agricultural Stabilization and Conservation Service; (2) Rural community fire protection funded through the Farmers Home Administration; and (3) funds allocated to the Forest Service by the Soil Conservation Service for the forestry aspects of watershed planning, flood prevention, river basin surveys and investigations, and resource conservation and development.

Table 3.11.--Planned Research program activities and costs

Alternative 3

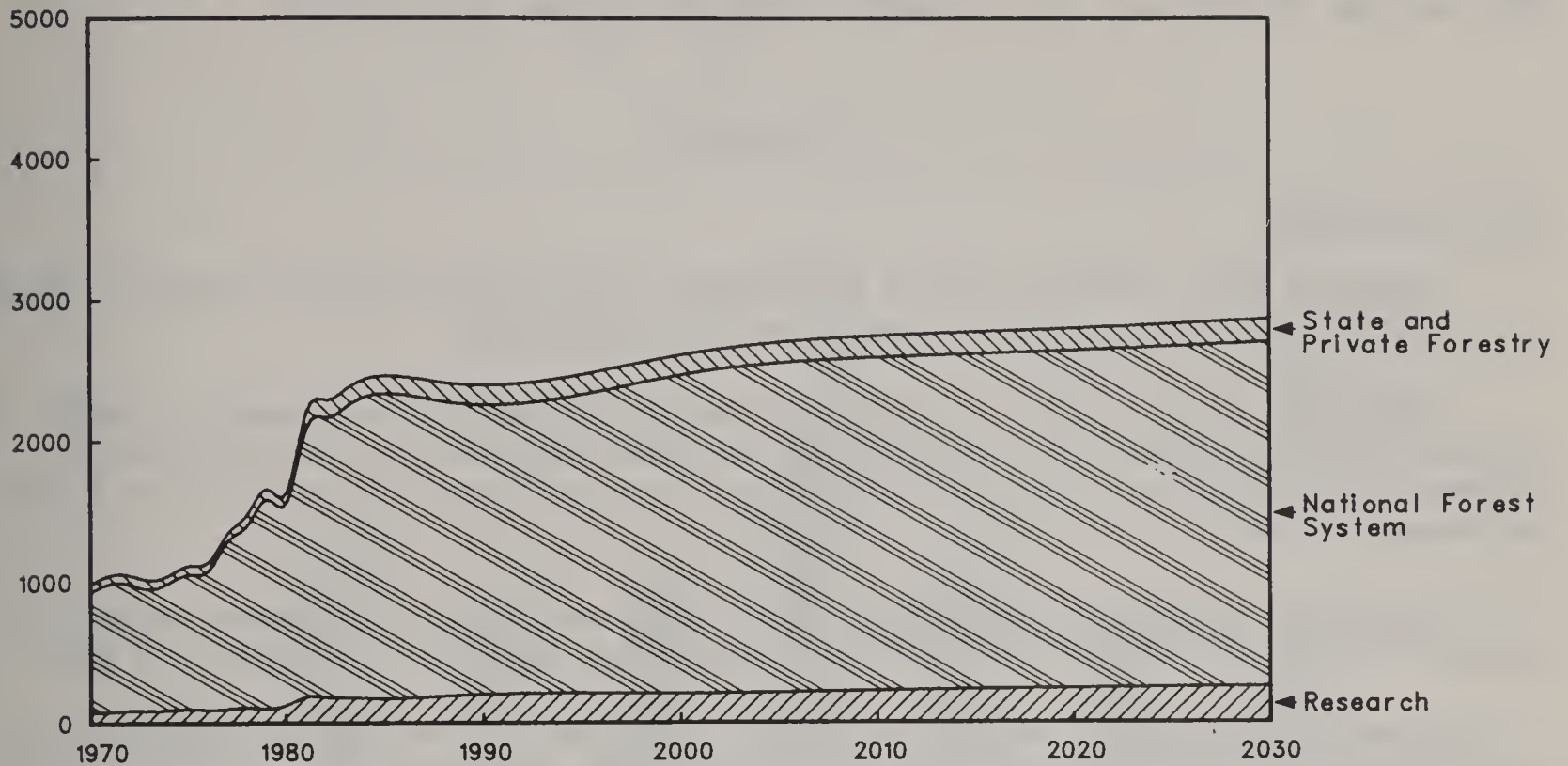
FOREST RECREATION RESEARCH	Moderate increases in knowledge to assess and predict recreation demand and protect resources.											
WILDERNESS RESEARCH	Moderate increase in knowledge to manage and protect wilderness and unique ecological features.											
WILDLIFE, FISH, AND PLANT HABITAT RESEARCH	More scientific knowledge of threatened and endangered species and species of high demand and their habitats.											
RANGE RESEARCH	Increased knowledge of natural range ecosystems for livestock production that are energy efficient.											
TIMBER MANAGEMENT RESEARCH	Increased knowledge of regeneration and intensive culture on best sites; alternative management systems for private ownerships.											
FOREST PRODUCTS UTILIZATION RESEARCH	Increased knowledge of wood for energy and biomass use, complete tree use, structural design, and hardwood products.											
FOREST ENGINEERING RESEARCH	Increased knowledge of harvesting wood for energy and solid products, and better engineering of energy farms.											
WATER RESOURCE RESEARCH	Increased knowledge to provide on-site quality and quantity, off-site yields and eliminate pollutants.											
SURFACE ENVIRONMENT AND MINING (SEAM) RESEARCH	Increased knowledge to maintain mined area streamflow quality, recreation, wildlife habitat, range and timber productivity.											
URBAN AND COMMUNITY FORESTRY RESEARCH	Moderate increases in knowledge to assess urban forest benefits, understand urban forest process, and protect and integrate urban forests into urban planning.											
FIRE AND ATMOSPHERIC SCIENCES RESEARCH	Increased knowledge of new improved fire management systems and impacts of fire on the environment.											
FOREST INSECT AND DISEASE RESEARCH	Increased number of impact assessment techniques and insect and disease management systems.											
RENEWABLE RESOURCES ECONOMIC RESEARCH	Improved economic analyses of multiresource management alternatives on all forest and range lands.											
RENEWABLE RESOURCES EVALUATION RESEARCH	Inventories and analyses of all renewable resources on a 10-year cycle.											
SOIL MANAGEMENT RESEARCH	Increased knowledge of soil resources for recreation, wildlife habitat and increased timber and range production on selected sites.											
COSTS RESEARCH-		BASE YEAR	AVERAGE ANNUAL COSTS									
	1970	1978	1981	1982	1983	1984	1985	1986-	1991-	2001-	2011-	2021-
								1990	2000	2010	2020	2030
Operational ^{1/}		105.8	3/154.2	158.0	161.8	165.6	169.4	187.2	206.4	224.4	239.1	251.6
Capital Investments ^{2/}		2.7	32.9	25.7	18.4	11.2	3.9	4.2	1.9	2.1	4.6	6.4
Total Research	76.4	108.5	187.1	183.7	180.2	176.8	173.3	191.4	208.3	226.3	243.7	258.0

^{1/} Research program costs only. YCC, YACC, and other Human Resource Programs are included with NFS.^{2/} Research construction.^{3/} All costs are in 1978 dollars.

Figure 3.67

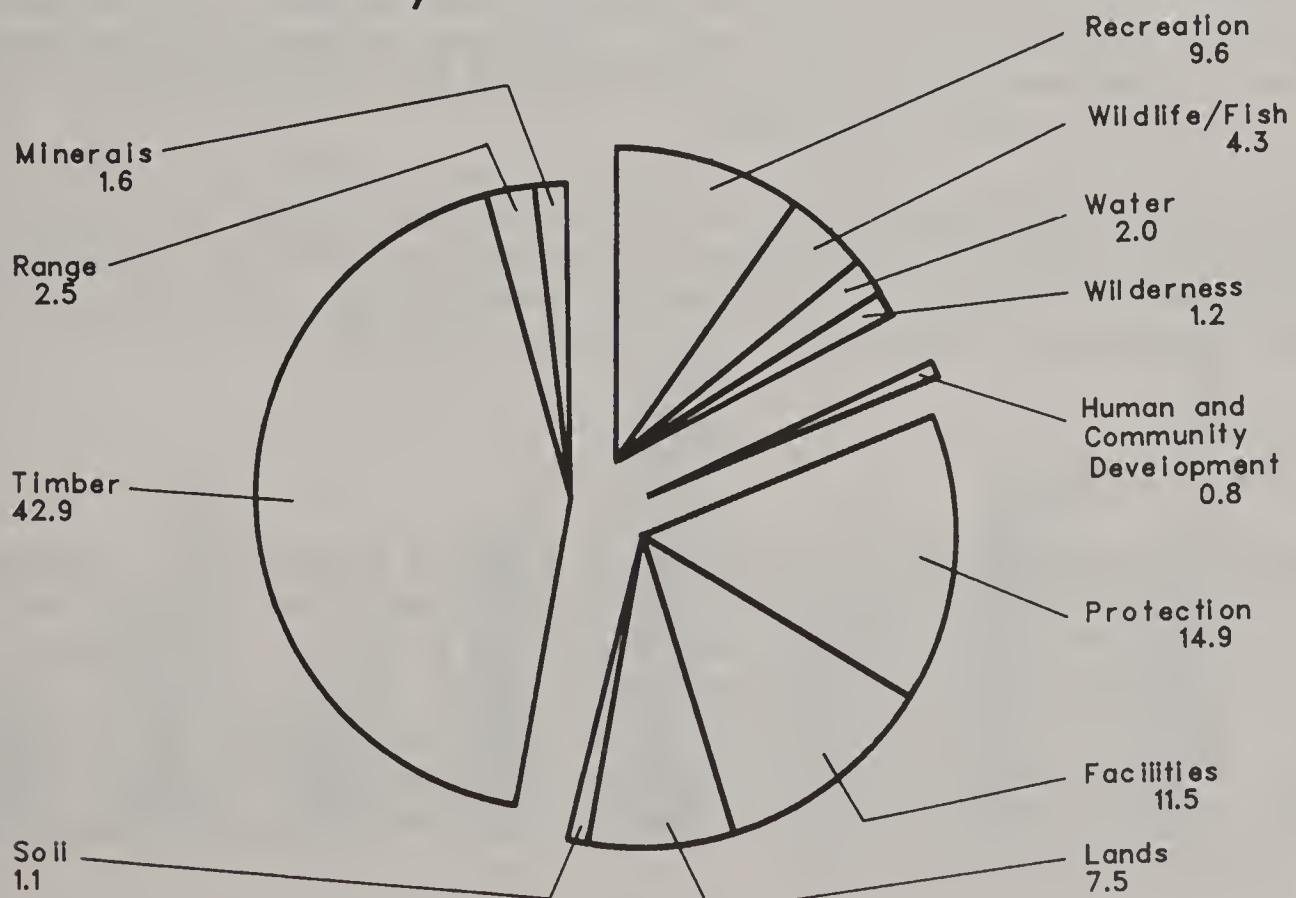
Program Cost-Alternative 3

Million Dollars



Appropriated Funds Only
Excludes Allocated Fund Estimates

Alternative 3 Percent of Total Cost by Element 1991 - 2000



THE DETAILS

This section contains additional narrative and graphic material on goals, outputs and activities for each element in Alternative 3. The last part of the section summarizes environmental effects of the Alternative.

Recreation

National Goals

General, NFS.--Provide for a moderately increased relative national share of use and dispersed outdoor recreation opportunities.

Developed sites, NFS.--Develop and maintain facilities needed to meet current relative share of concentrated use with emphasis on accessibility to urban and high-use areas utilizing the private sector or other authorities as demand allows.

Dispersed recreation use, NFS.--Provide a moderately increased supply of outdoor recreation while maintaining the current share of concentrated use.

Private investment, NFS.--Encourage expansion of private investment and operation of facilities on, adjacent to, and compatible with the NFS.

Visitor Interpretive Service (VIS), visual and cultural resource management, NFS.--Provide interpretive service at existing visitor centers and other high-use areas. Moderately increase orientation services. Emphasize dispersed outdoor recreation opportunities. Analyze, manage, and promote visual and cultural resource values.

Cooperation with others, S&PF.--Participate in cooperative planning and provide technical assistance in nonincome-producing types of outdoor recreation on other public and private lands. Private owners desiring technical assistance for income-producing projects would be referred to the Soil Conservation Service or to consultants.

Forest recreation research.--Conduct moderate effort to increase development and use of scientific knowledge to assess and predict recreation demand and supply; improve methods for planning, protecting, and managing recreation and visual resources; and improve technology transfer.

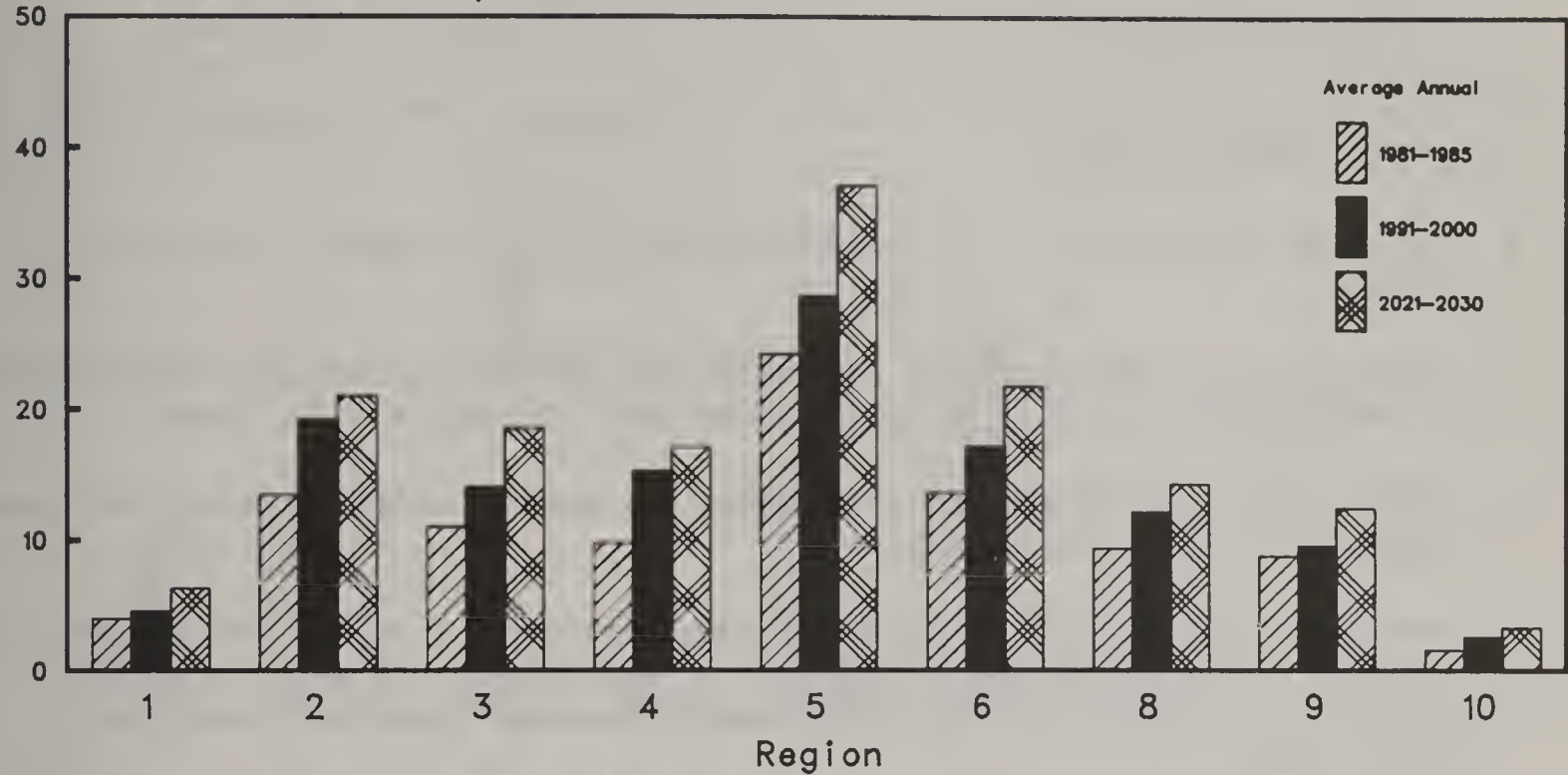
Outputs and Activities

National Forest System.--Alternative 3 would provide for a moderately increased supply of recreational opportunities on National Forest lands. Use (excluding wilderness) would increase from 210 million visitor days in 1978 to 362 million visitor days in 2025 (table 3.9). As depicted in figures 3.68 and 3.69, this increase in use would occur about equally throughout all Regions. Cultural resources would receive increased interpretation and enhancement, emphasizing offsite interpretation compatible with dispersed outdoor recreational opportunities.

Figure 3.68

Regional Estimates-Alternative 3 Developed Recreation Use (NFS)

Million Recreation Visitor Days

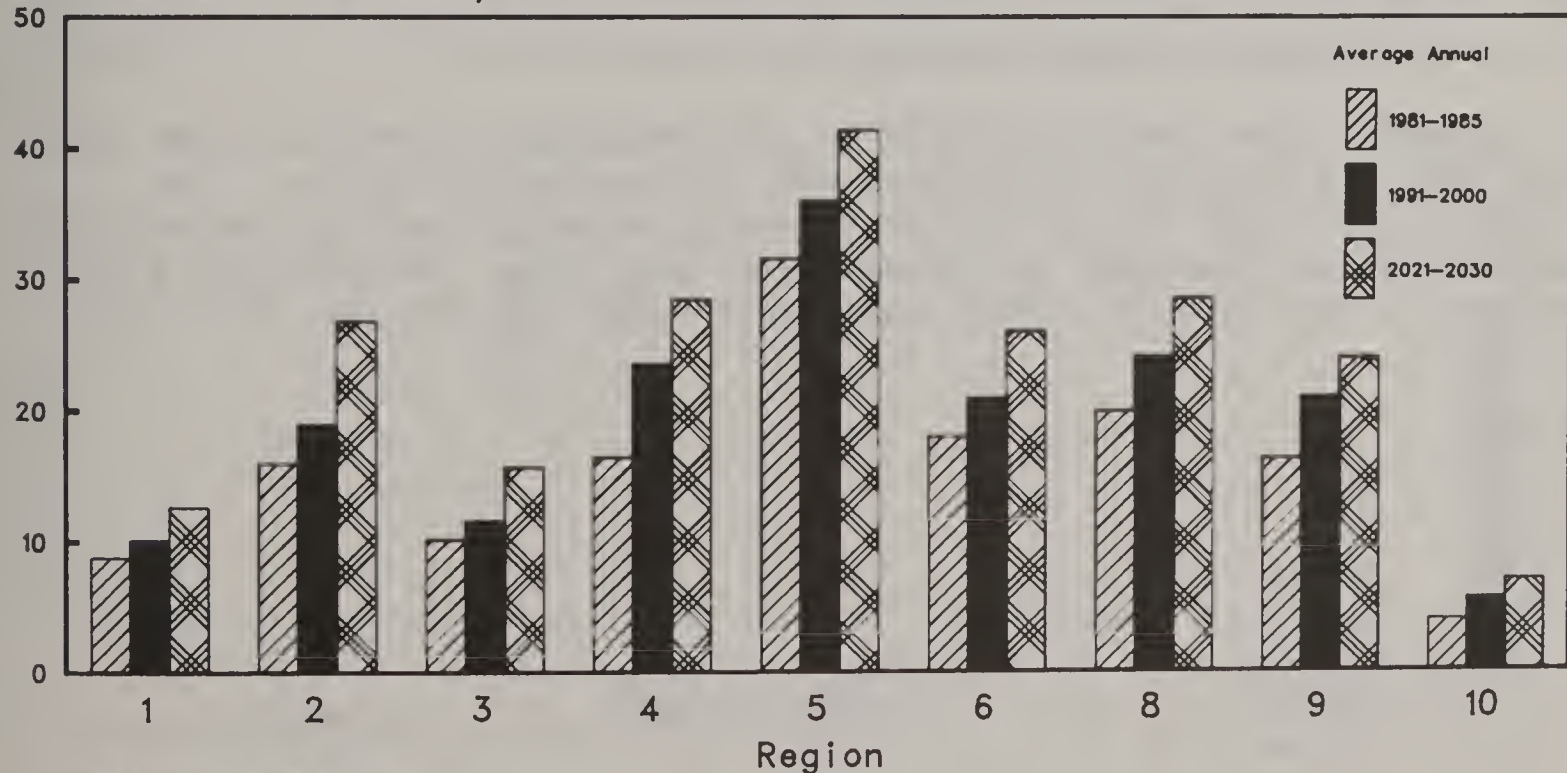


Includes Visitor Information Services

Figure 3.69

Regional Estimates-Alternative 3 Dispersed Recreation Use (NFS)

Million Recreation Visitor Days



Excludes Wilderness Use

Highlights of Alternative 3 are:

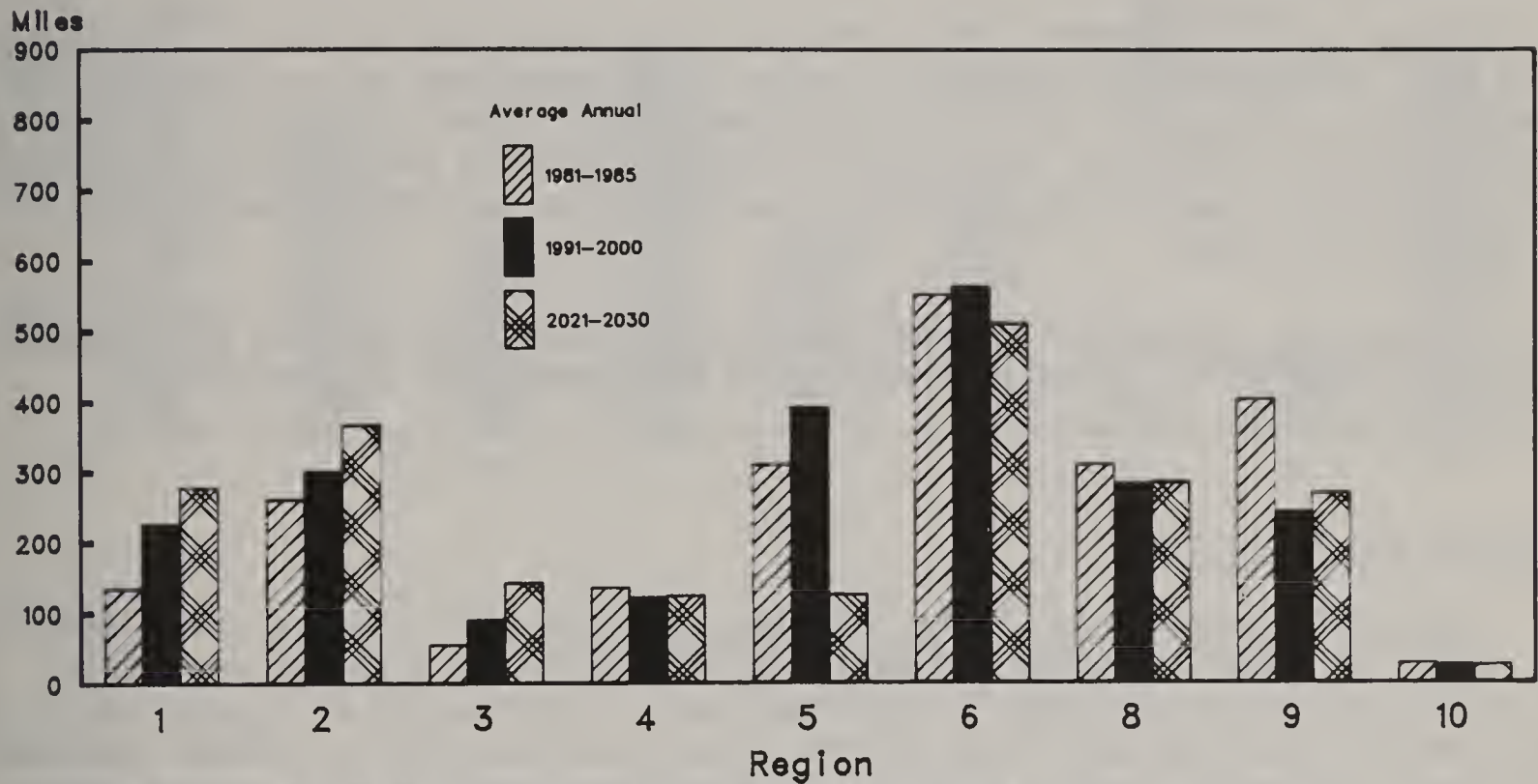
- Provide for increased activities in dispersed areas.
- Furnish a high percentage of capital investments required for development of recreation facilities and trail construction (figure 3.70).
- Provide a high-level program for maintenance.
- Encourage the private sector to provide facilities on private lands or on the National Forests where private lands are not available.
- Provide full level of service at 75 percent of the developed sites and dispersed areas.
- Increase the number of developed sites to be included in the fee system.
- Participate in cooperative planning and provide technical assistance to recreation opportunities on other public and private lands.
- Develop and use increased technology to assist with planning and management of visual resources.
- Provide a full range of interpretive services at all interpretive sites and key dispersed areas, and a moderate level of orientation services at key developed sites and remaining dispersed areas as practicable.
- Protect cultural resources at current levels. Conduct moderate level of compliance-related cultural resource activity to meet moderate activity levels in other areas. Complete National Forest overviews by 1982 and inventory by 1990.

State and Private Forestry.--Planning and technical assistance for dispersed recreation and scenic values would be provided through increased emphasis on multiresource forest management plans for private and non-Federal public lands (figure 3.71). Landowners would be informed of the various recreational benefits available through diversified management and cooperation with an increasingly outdoor recreation-oriented public.

Research.--New knowledge would be acquired about current use and users and on benefits and costs associated with recreation activities. New technology would improve procedures to manage esthetic quality and cultural resources and to integrate recreation with other uses. Methods would be developed to improve user safety and reduce vandalism and user conflicts.

Figure 3.70

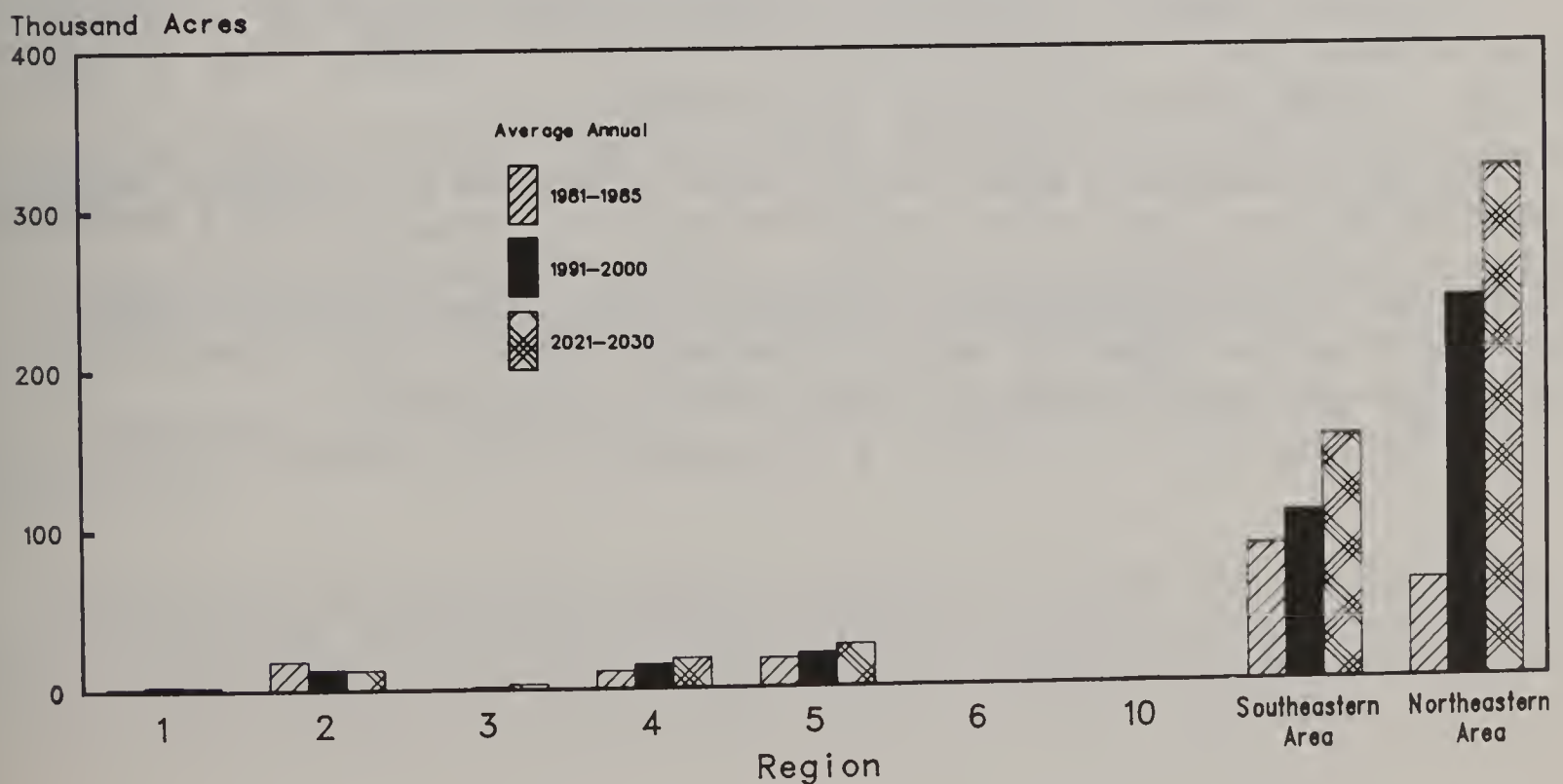
Regional Estimates-Alternative 3 Trail Construction-Reconstruction (NFS)



Includes All Trails: Recreation, Stock, Administrative, and Other

Figure 3.71

Regional Estimates-Alternative 3 Technical Assistance for Dispersed Recreation (S&PF)



National Goals

Wilderness designation, NFS.--Recommend a moderate increase of high-quality wilderness that contains a range of wilderness values including primitive recreation; solitude; natural integrity; naturalness; and ecological, geological, or other features of scientific, educational, or historical value.

Wilderness management, NFS.--Provide for a moderate increase in wilderness use, protection of wilderness values, and reduction of conflict through improved use, dispersal and other management techniques. Maintain a range of conditions for primitive recreation; solitude; natural integrity; naturalness; and ecological, geological, or other features of scientific, educational, or historical value.

Wilderness research.--Conduct a moderate effort to increase development and use of scientific knowledge regarding management and protection of wilderness values.

Outputs and Activities

National Forest System.--An increase of about 17.5 million acres (middle of range, as shown in projected national outputs Table 3.13) of designated wilderness would be provided in Alternative 3. This would be beyond the existing 15.3 million acres of wilderness and the 4.5 million acres proposed, endorsed, and under study. Figure 3.72 indicates most of this growth would occur in Western States and Alaska.

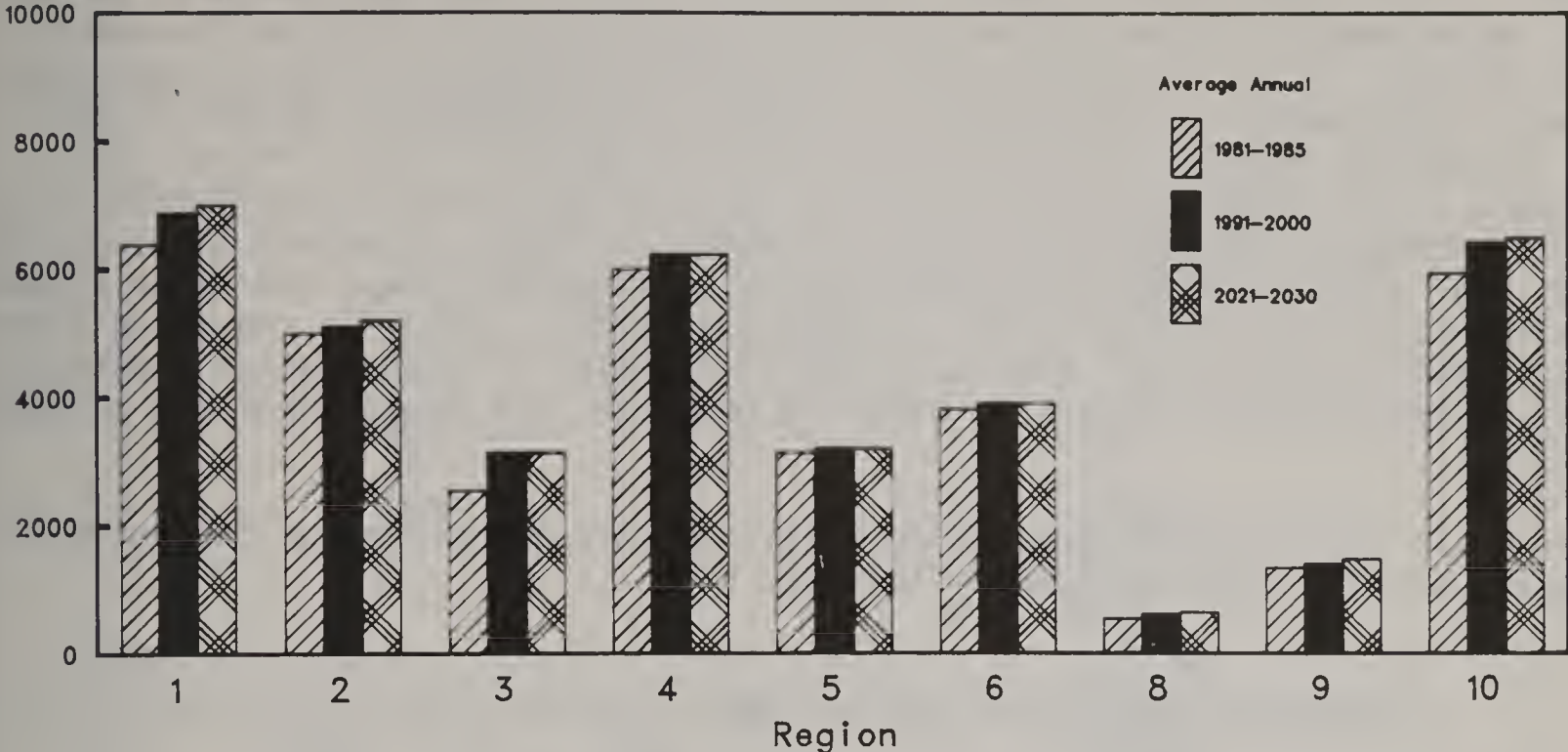
A moderate increase of wilderness acreage in Alternative 3 would result in a moderate rate of wilderness use. This increased use would necessitate a moderate increase of wilderness management efforts to protect wilderness values. This would translate into some increase in permit systems, employment of seasonal wilderness managers, implementation of wilderness management plans, and informational efforts.

A moderate amount of wilderness research projects could be activated under Alternative 3. Selection would be limited to a medium range of activities to provide results for wilderness managers.

Research.--Research would produce ways to measure use, explain characteristics of users, and solve sanitation problems. Research would determine how to maintain isolation from sights, sounds, and presence of others; ensure that long-term ecological processes remain intact; identify endangered or threatened species; maintain unusual plant or animal communities; and measure the significance of scenic quality preservation.

Regional Estimates-Alternative 3 Wilderness Management (NFS)

Thousand Acres
10000



Wildlife and Fish

National Goals

Endangered and threatened species, NFS.--Intensively manage habitat for species on Federal and State lists to protect and maintain populations and to enhance in conformance with recovery plans.

Habitat diversity, NFS.--Provide habitat diversity, well distributed, on each Ranger District to maintain populations of all indigenous vertebrate and selected invertebrate wildlife species.

Enjoyment of wildlife and fish in developed areas, NFS.--Develop opportunities for appreciative (nonconsumptive) enjoyment of wildlife and fish at 80 percent of the developed recreation and VIS sites.

Fish habitat improvement, NFS.--Manage anadromous fish habitat to produce at 90 percent or more, and resident fish habitat to produce at 80 percent or more of potential.

Population levels, NFS.--Provide habitat for moderate population levels of all species that are economically or socially important.

Cooperation with others, S&PF.--Provide cooperative technical assistance for improved coordination and management of wildlife and fish habitat on forested lands.

Wildlife, fish, and plant habitat research.--Develop and use more scientific knowledge about threatened and endangered species, plus other species and their habitats, and develop methods to apply available information about selected high demand wildlife and fish species and their habitats.

Outputs and Activities

National Forest System.--Wildlife habitat improvements would increase from 2.3 million acre equivalents in 1978 to 3.1 million in 1985. Thereafter, maintenance would largely offset the need for new improvements, except for replacement, and the acre-equivalents would decline to 1.4 million in 2025 (figure 3.73). Anadromous fish habitat improvements would increase the annual contribution of the National Forests to the commercial salmon fishery by 3.8 million pounds in 1985 and 25.5 million pounds by 2005 through 2025 (figure 3.74). Maintenance of both wildlife and fish habitat improvements would increase throughout the period. Moderate outputs of market goods would mean that wildlife dependent on dead trees, old-growth trees, and dense riparian vegetation would be provided at moderate levels. Wildlife requiring other successional stages would also be at moderate levels. Coordination measures among other resource activities would be moderate, yet higher than the present level.

It is expected that population levels of certain management indicator species by 1995 would respond as follows:

Management Indicator Species Index (Current Situation = 100)

<u>Species</u>	<u>Alternative 3</u>
Mule deer	120
White-tailed deer	120
Black-tailed deer	125
Elk	118
Wild turkey	133
Resident trout	115
Cavity nesting birds	110
Anadromous fish	130

Alternative 3 is moderately responsive to public comments calling for increased emphasis on wildlife and fish.

State and Private Forestry.--Technical and related assistance for wildlife and fish habitat improvement would be increased moderately on private and non-Federal public forest lands through encouragement of wildlife objectives in landowners' multiresource forest management plans. Regional variations in acres which would receive technical assistance are illustrated in Figure 3.75.

State forestry agencies in cooperation with State fish and wildlife agencies would provide biologists to assist onsite specialist assistance and to train foresters to recognize and help implement fish and wildlife opportunities

Research.--New knowledge would be acquired to improve the management of threatened and endangered species as well as other species and their habitats for which consumptive and nonconsumptive demand is high. Research would assist in developing recovery plans for endangered vertebrate and invertebrate species. The integration of land use and resource management activities to maintain or increase populations of endangered species or other high-value fish and wildlife populations would be greatly facilitated.

Figure 3.73

Regional Estimates-Alternative 3 Wildlife Habitat Improvement (NFS)

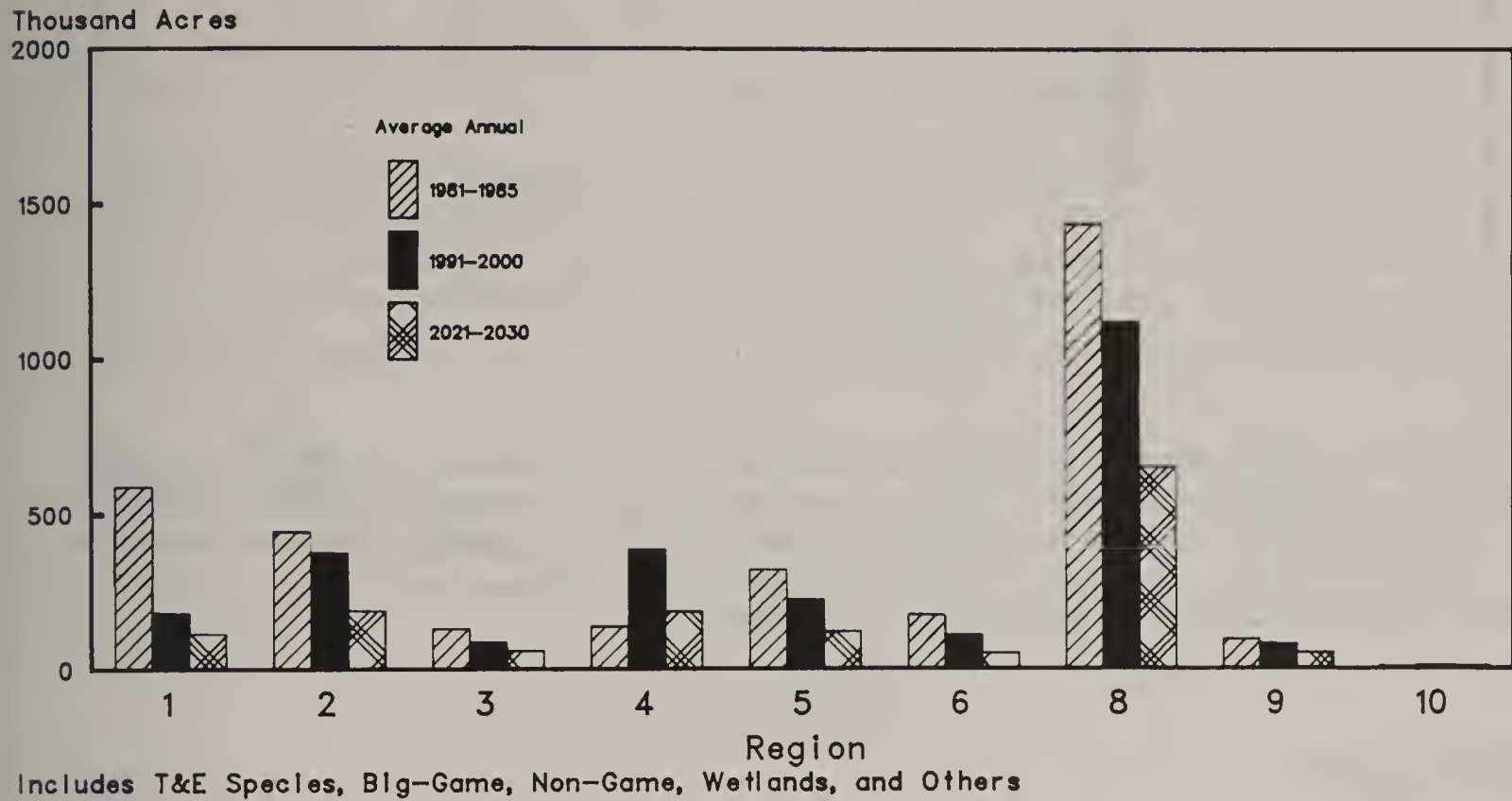
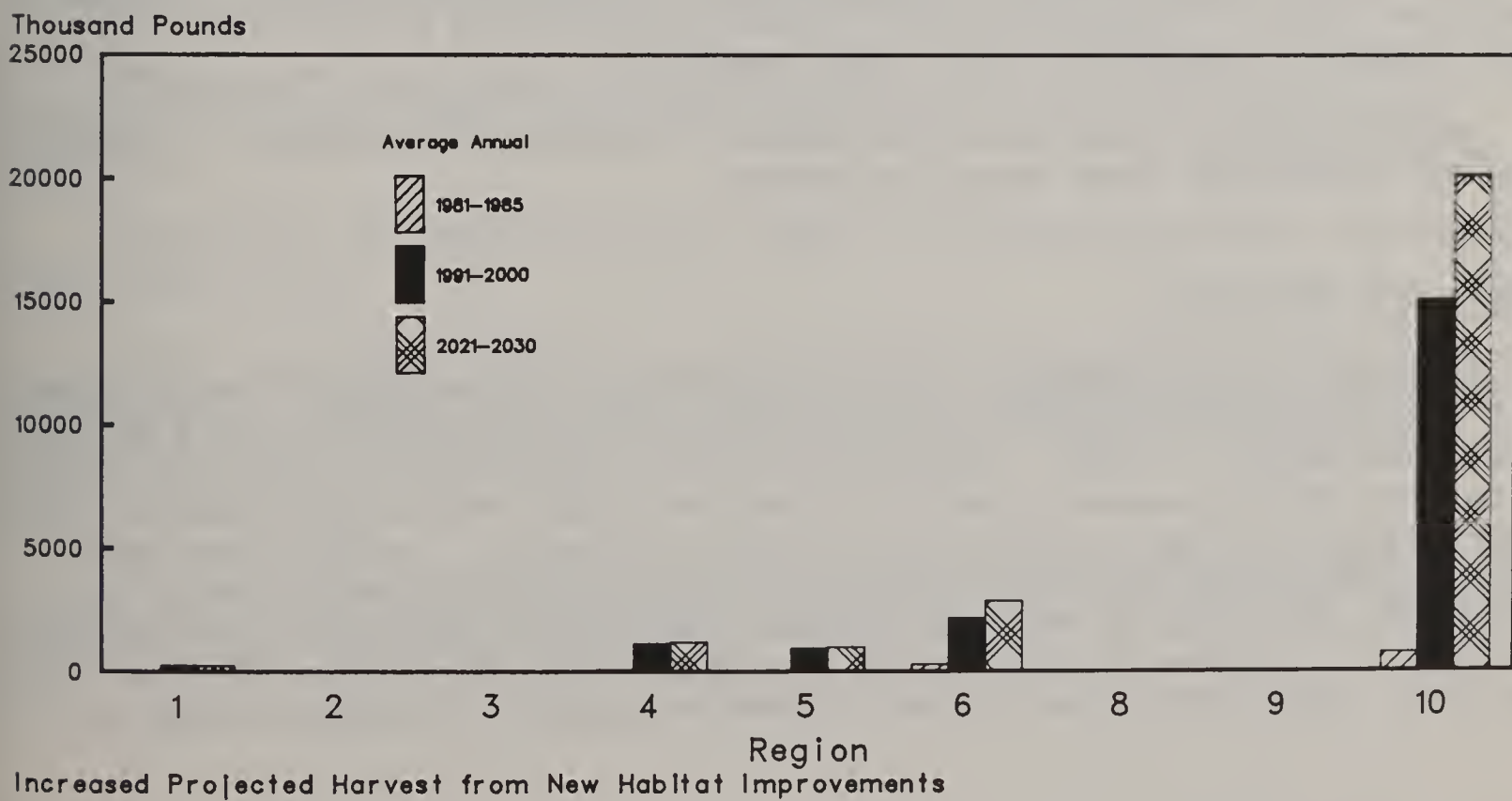


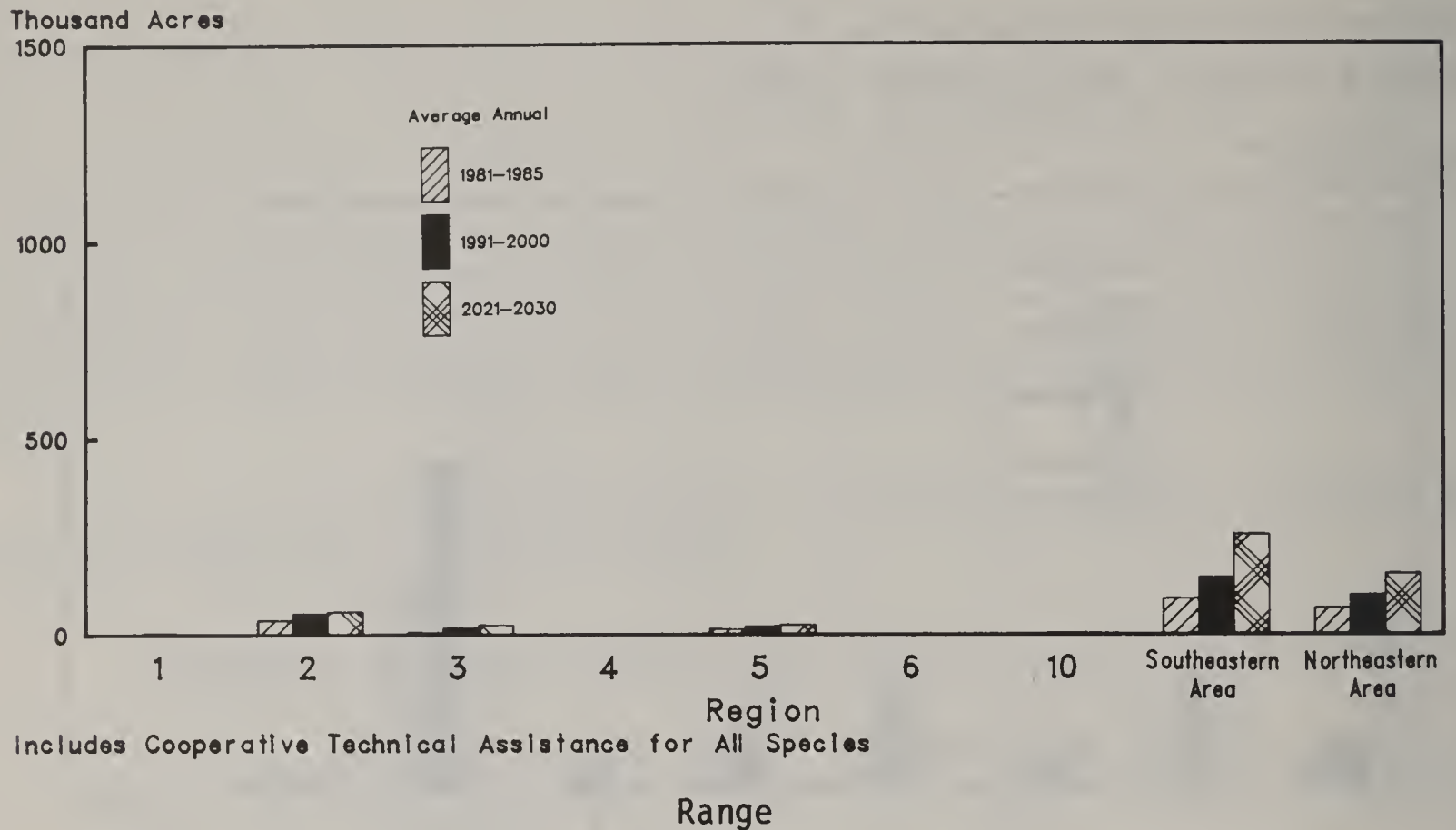
Figure 3.74

Regional Estimates-Alternative 3 Anadromous Fish (NFS)



Regional Estimates-Alternative 3

Technical Assistance for Wildlife Habitat Improvement (S&PF)



National Goals

Range management, NFS.--Provide forage for livestock grazing without impairing land productivity by moderately increasing number of permitted livestock, schedule grazing on presently unused range, install and repair additional structural improvements, make nonstructural improvements to augment native vegetation and other uses, and treat rangeland in unsatisfactory condition to eliminate environmental damage and increase productivity.

Cooperation with others on non-Federal forested ranges, S&PF.--Provide a moderate level of cooperation and technical assistance on non-Federal forested ranges in cooperation with other agencies.

Range research.--Develop and disseminate scientific knowledge to increase livestock production from range ecosystems.

Outputs and Activities

National Forest System.--Livestock grazing in the National Forest System would increase from the present 9.9 million animal-unit-months to 13.2 million animal-unit-months in 2025. Accomplishing this would entail increasing coordination with other resource uses, utilizing transitory range opportunities, and concentrating grazing use on the most productive lands. Lands having less potential would only be lightly grazed or grazing would be phased out. It is anticipated that grazing would be reduced from the 103 million acres presently grazed in the National Forest System to approximately 85 million acres by the year 2025. Under this alternative, discontinuous grazing systems, such as rest

rotation, would be employed along with introduction of improved forage species on suitable sites. Rangelands in low ecological condition would be improved. Where such lands are presently grazed and cannot be improved on a cost-effective basis, grazing would be phased out. Returns to the government would increase. Unit costs for operation and maintenance of this program would decrease as intensive use is concentrated on the most productive areas. Unit costs for capital investments, such as fencing and water developments, would also decrease. The three existing programs to evaluate and test the range program would be continued. Shifts in grazing use, in addition to concentration on the most productive sites, would involve increased use of grazing opportunities on National Forests in the Eastern United States (figure 3.76).

State and Private Forestry.--A moderate increase in technical and related assistance for forage production on non-Federal forested ranges would be provided in close cooperation with other responsible agencies (figure 3.77). Landowners would be encouraged to include range objectives in multiresource forest management plans when range is compatible with timber or other forest resource uses.

Research.--Research would provide new scientific knowledge on how to enhance livestock production. New technology would provide energy-efficient strategies for development of effective benefit-cost ratios and determinations, identify future demands, help resolve user conflicts, and improve public involvement.

Timber

National Goals

Timber supply, NFS.--Increase timber supply at a moderate rate.

Silvicultural practices, NFS.--Intensify application of silvicultural practices on commercial forest land.

Wood utilization, NFS.--Supplement timber supply from harvested and treated areas by recovering a large proportion of the available wood fiber including expanding use for chemical and energy conversion.

Cooperation in private forest management, S&PF.--Encourage moderate expansion of private timber supply and application of improved management practices.

Cooperation in wood utilization, S&PF.--Encourage moderately increased use of wood fiber.

Timber management research.--Intensify basic and applied research on regeneration and intensive culture of major forest types on best sites and develop alternative management strategies for private forest ownerships to incorporate multiresource values.

Forest products utilization research.--Research programs on wood as an energy source and biomass assessment will be accelerated; those on complete-products from low-grade hardwoods will be continued.

Figure 3.76

Regional Estimates-Alternative 3 Grazing Use (NFS)

Thousand Animal Unit Months

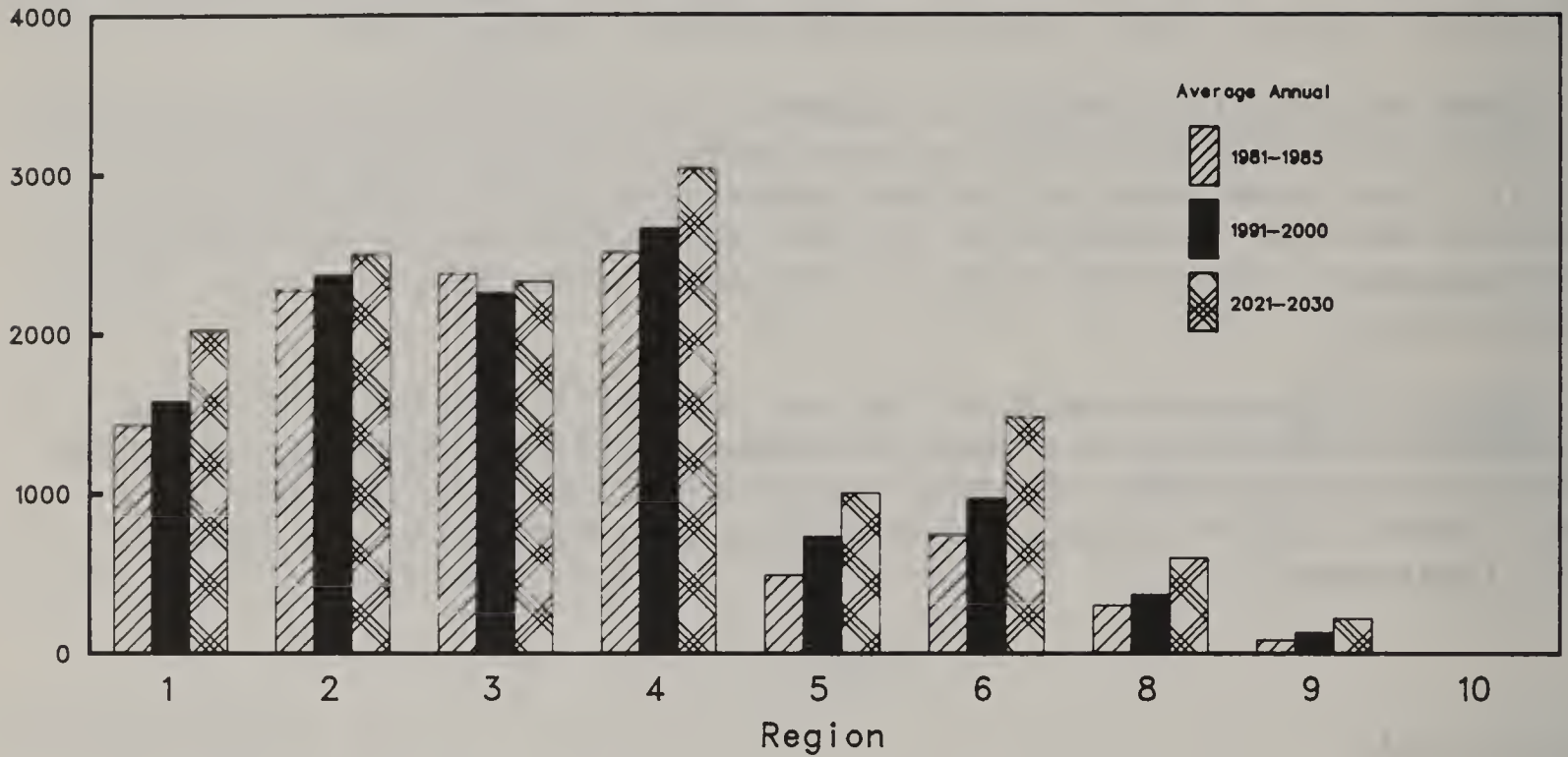
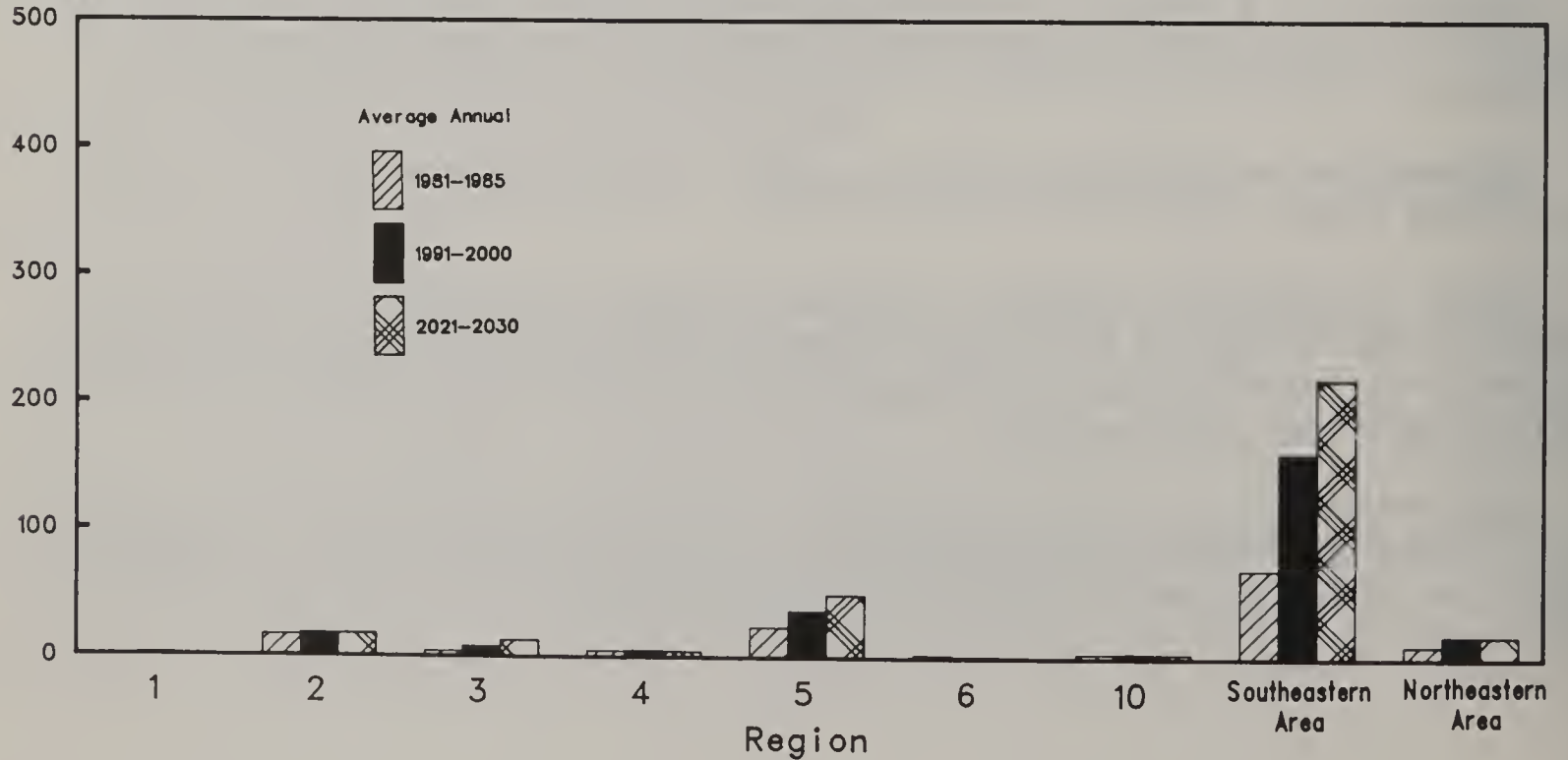


Figure 3.77

Regional Estimates-Alternative 3 Technical Assistance for Range Improvement (S&PF)

Thousand Acres



Forest engineering research.--Emphasize research on harvesting and transporting wood for energy, new fiber, and solid wood products, and address engineering problems related to energy farms.

Outputs and Activities

National Forest System.--Under Alternative 3, the National Forest System would increase the timber sale offering at a moderate rate from 12.2 billion board feet local scale in 1978 to 16.4 billion board feet by 2025 (figure 3.78). Timber harvesting would occur on all remaining commercial forest land by 2010, with primary emphasis on regeneration and salvage harvests followed by increased reliance on intermediate harvests. Overmature stands would be scheduled for harvest to meet current timber demand within sustained yield principles. Stocking level and species control would be maintained through the life of highly productive stands. Harvests would be scheduled to accelerate attainment of desired age class structures. Reforestation would be 414,000 acres in 1988 and increase to 476,000 acres by 2025 (figure 3.79). tive regeneration-harvested and catastrophically deforested lands would be required. Fertilization would be increased, as feasible, where cost effective. A large proportion of the available wood fiber from harvested and treated areas would supplement the timber supply. A total of 511,000 acres of reforestation backlog will be regenerated, allowing for a moderate increase in the timber supply. Total timber stand improvement efforts would remain stable nationally, but Regional programs would vary with opportunity (figure 3.80).

For NFS, Alternative 3:

- Permits moderate expansion of the wood-for-energy concept by increasing availability of harvest residues.
- Supports RPA goals of increasing softwood production from National Forests to dampen stumpage price increases and maintain forestry employment opportunities.

State and Private Forestry.--Moderate increases in the level of timber harvest within the National Forest System would probably reduce the economic incentives for management of timber on State and private forest lands. The Forest Service would provide moderately increased levels of financial and technical assistance for proper sale, harvest, and processing techniques as well as increased and improved timber growth (figures 3.81, 3.82, 3.83, 3.84, and 3.85).

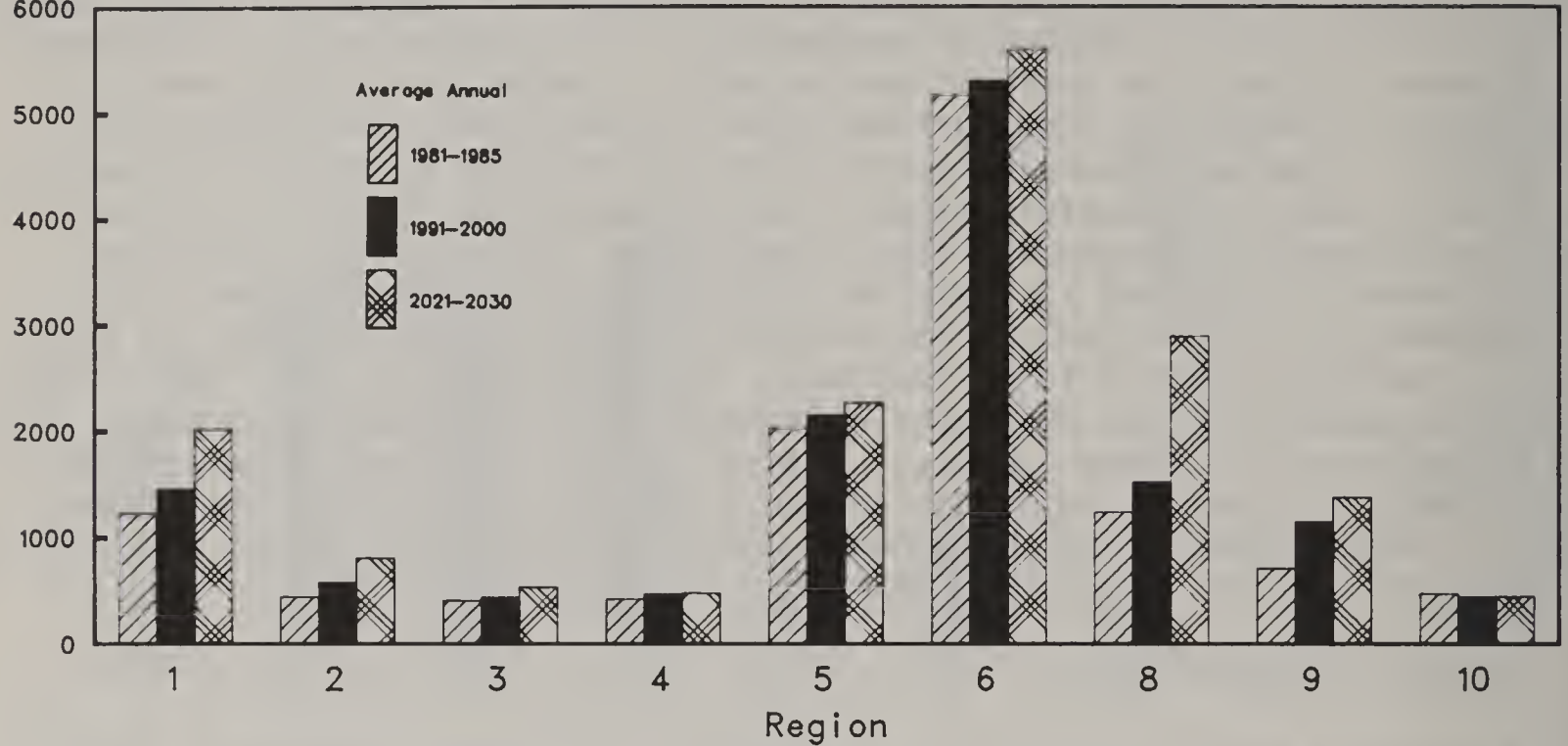
Research.--Timber management research: A moderate program of basic and applied timber management research would be conducted. Emphasis would be on regeneration research to provide new genotypes and reforestation techniques to support production of timber and other market goods on public ownerships. New management guides would be developed and published for intensive culture of high-yielding forest types on the best sites. New management strategies would be developed to enhance nonmarket multiresource values on private forest ownerships.

Forest products utilization research: Research output would be presented in a handbook on total forest biomass availability on commercial forest lands. Research results would be available on the feasibility of

Figure 3.78

Regional Estimates-Alternative 3 Programmed Sales Offered (NFS)

Million Board Feet (Local Scale)

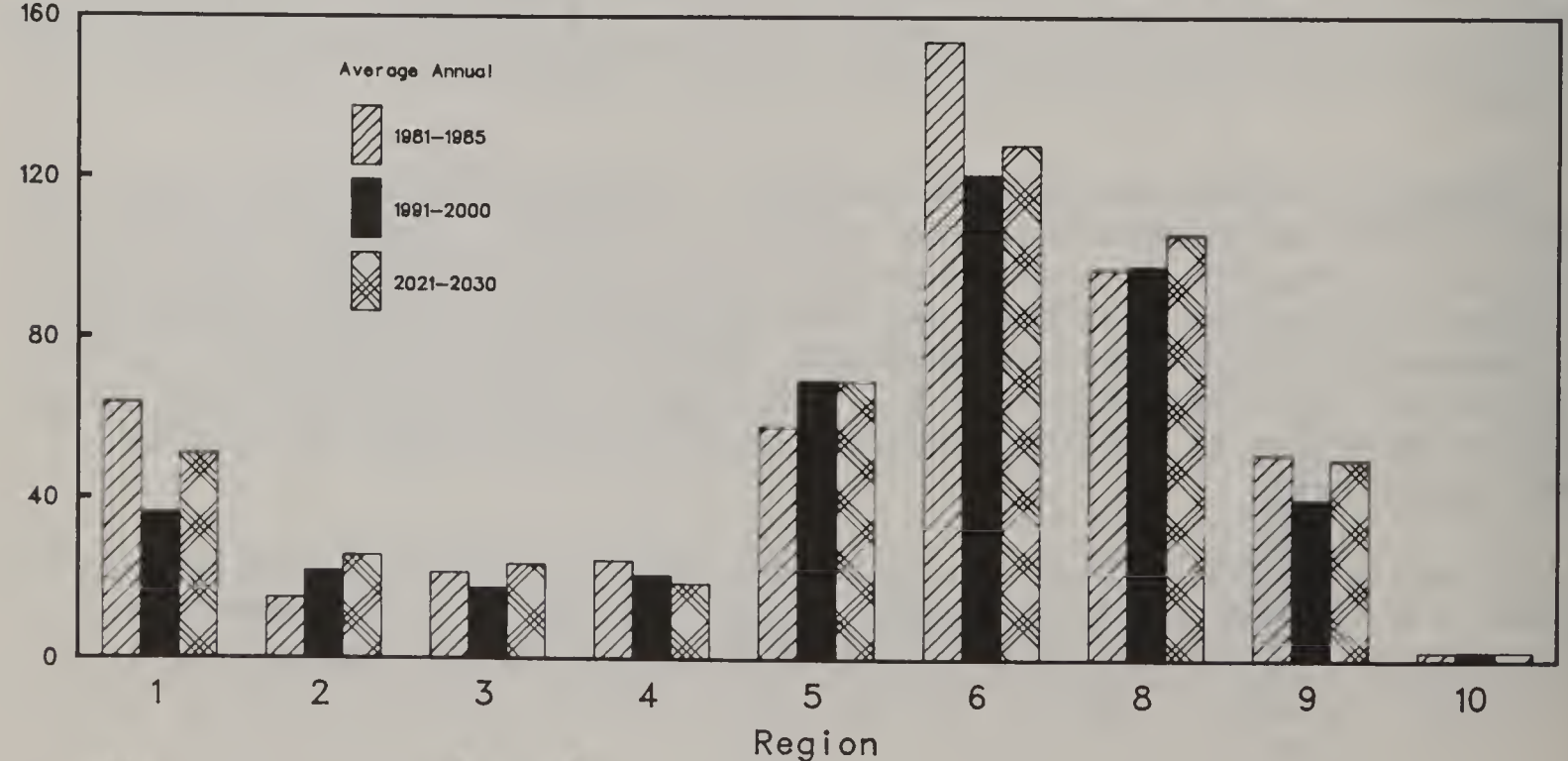


Includes Live and Mortality; Hardwood and Softwood

Figure 3.79

Regional Estimates-Alternative 3 Reforestation (NFS)

Thousand Acres



Includes KV and Appropriated Funds

Figure 3.80

Regional Estimates-Alternative 3 Timber Stand Improvement (NFS)

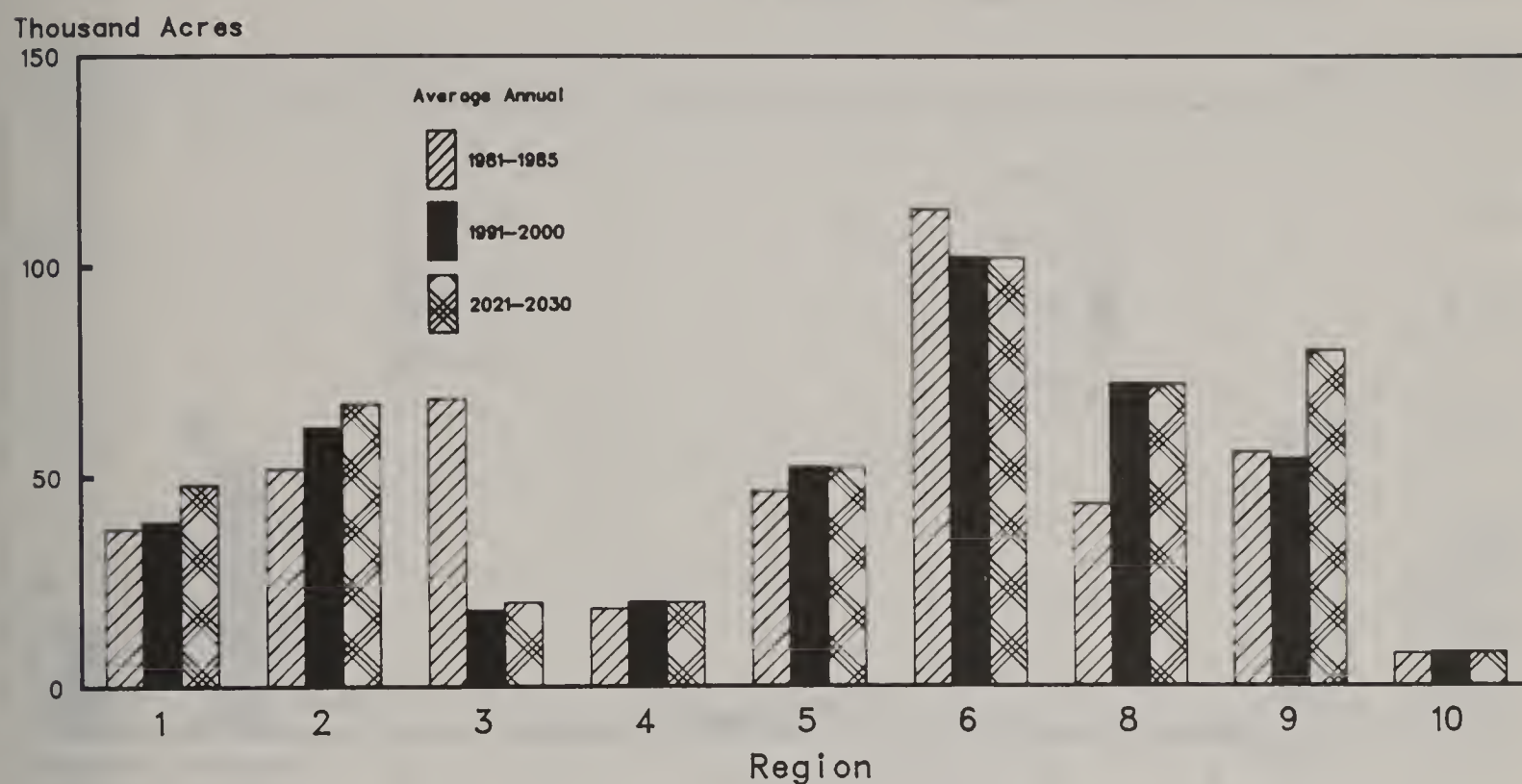
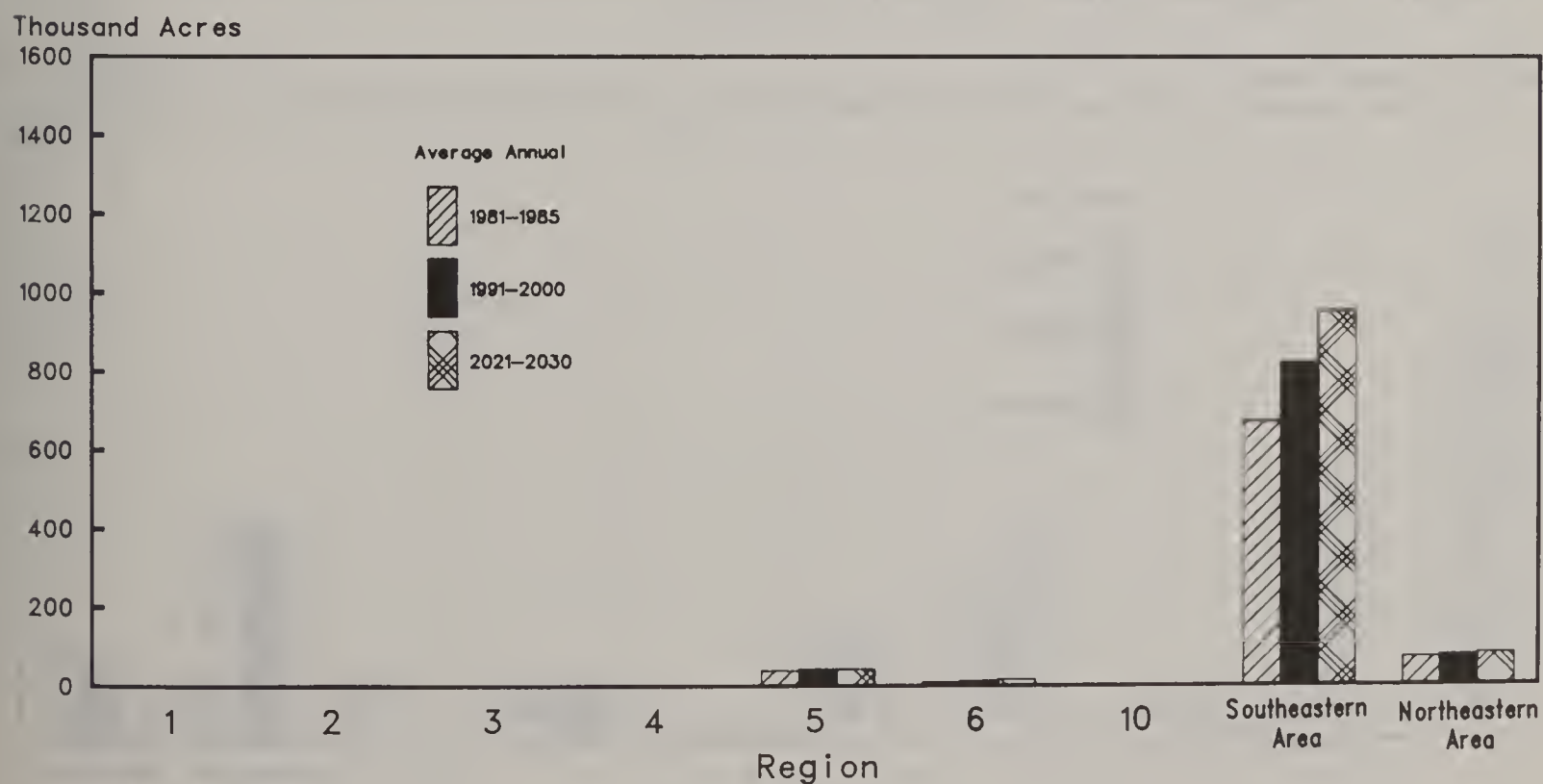


Figure 3.81

Regional Estimates-Alternative 3 Reforestation (S&PF)



Includes RFA, FIP, and ACP

Figure 3.82

Regional Estimates-Alternative 3 Timber Stand Improvement (S&PF)

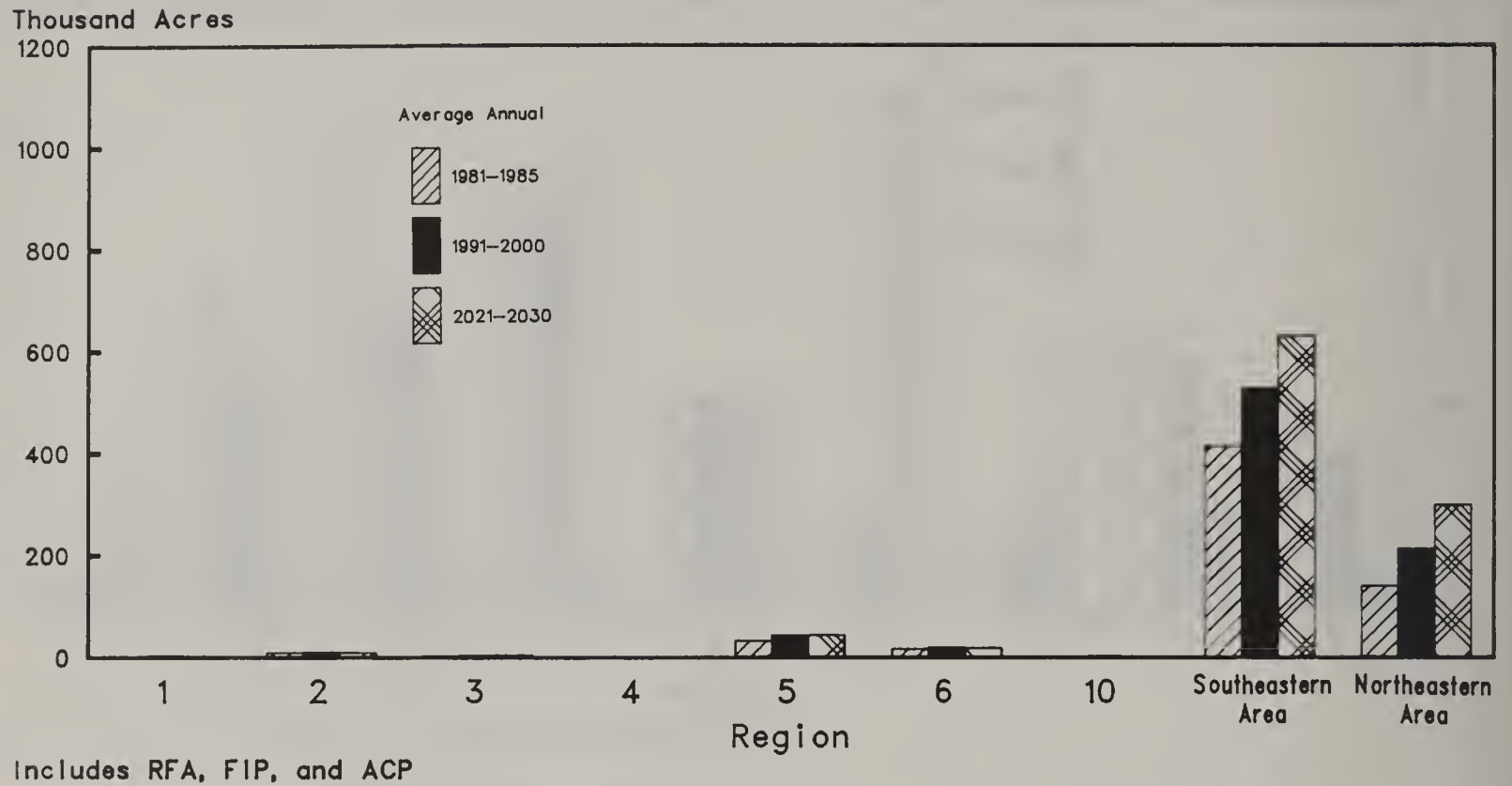


Figure 3.83

Regional Estimates-Alternative 3 Timber Prepared for Harvest (S&PF)

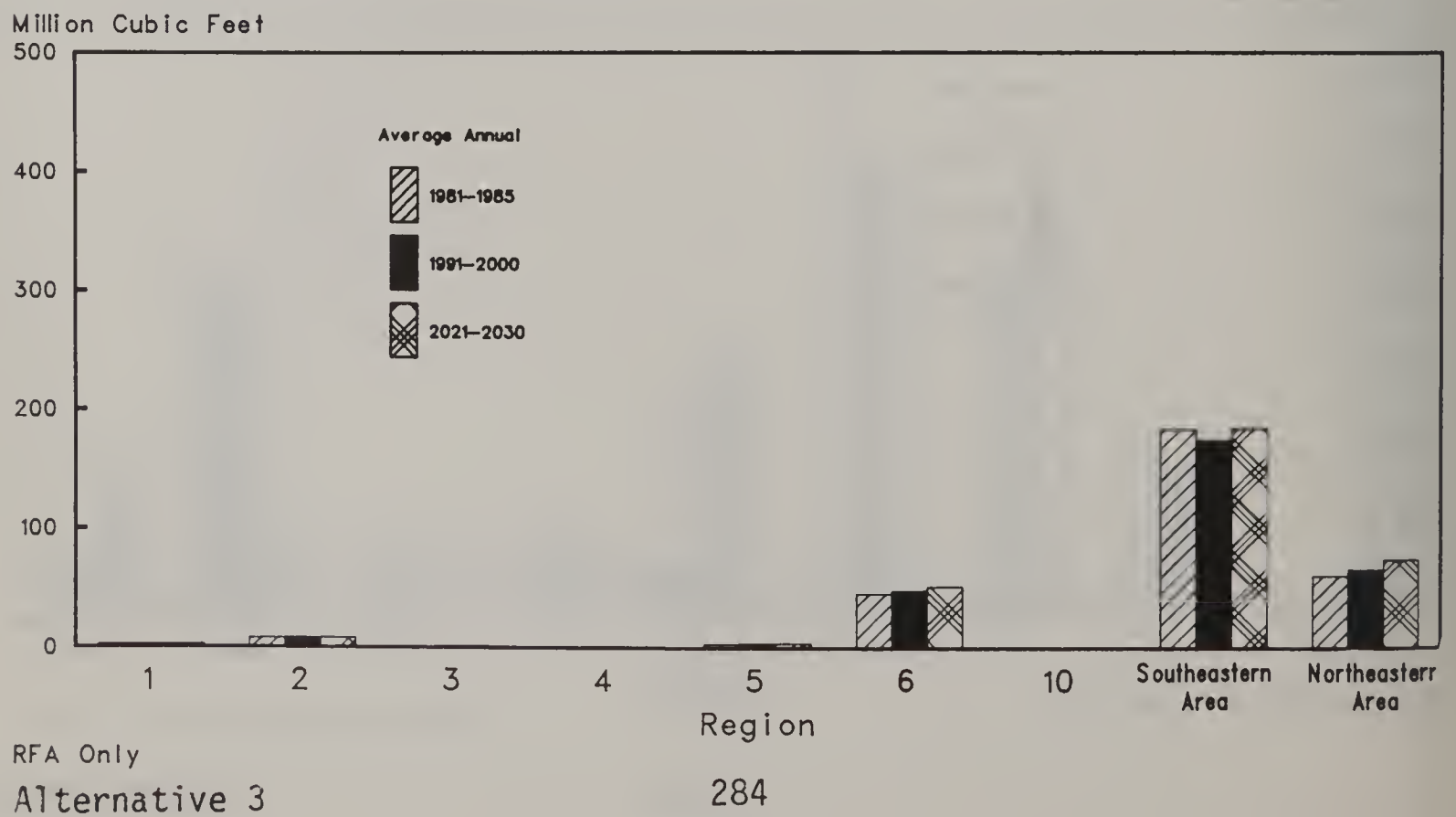


Figure 3.84

Regional Estimates-Alternative 3 Woodland Owners Assisted (S&PF)

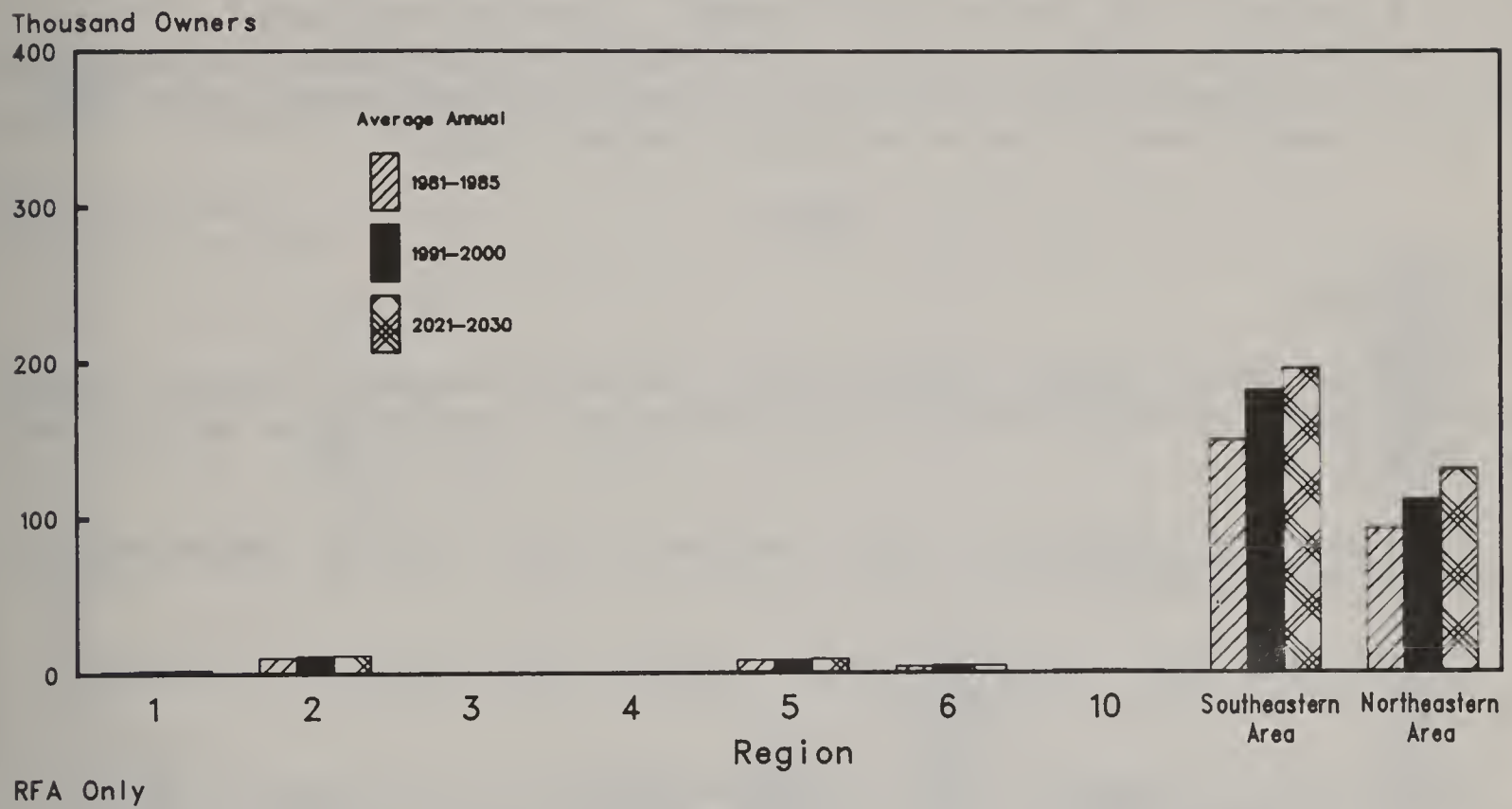
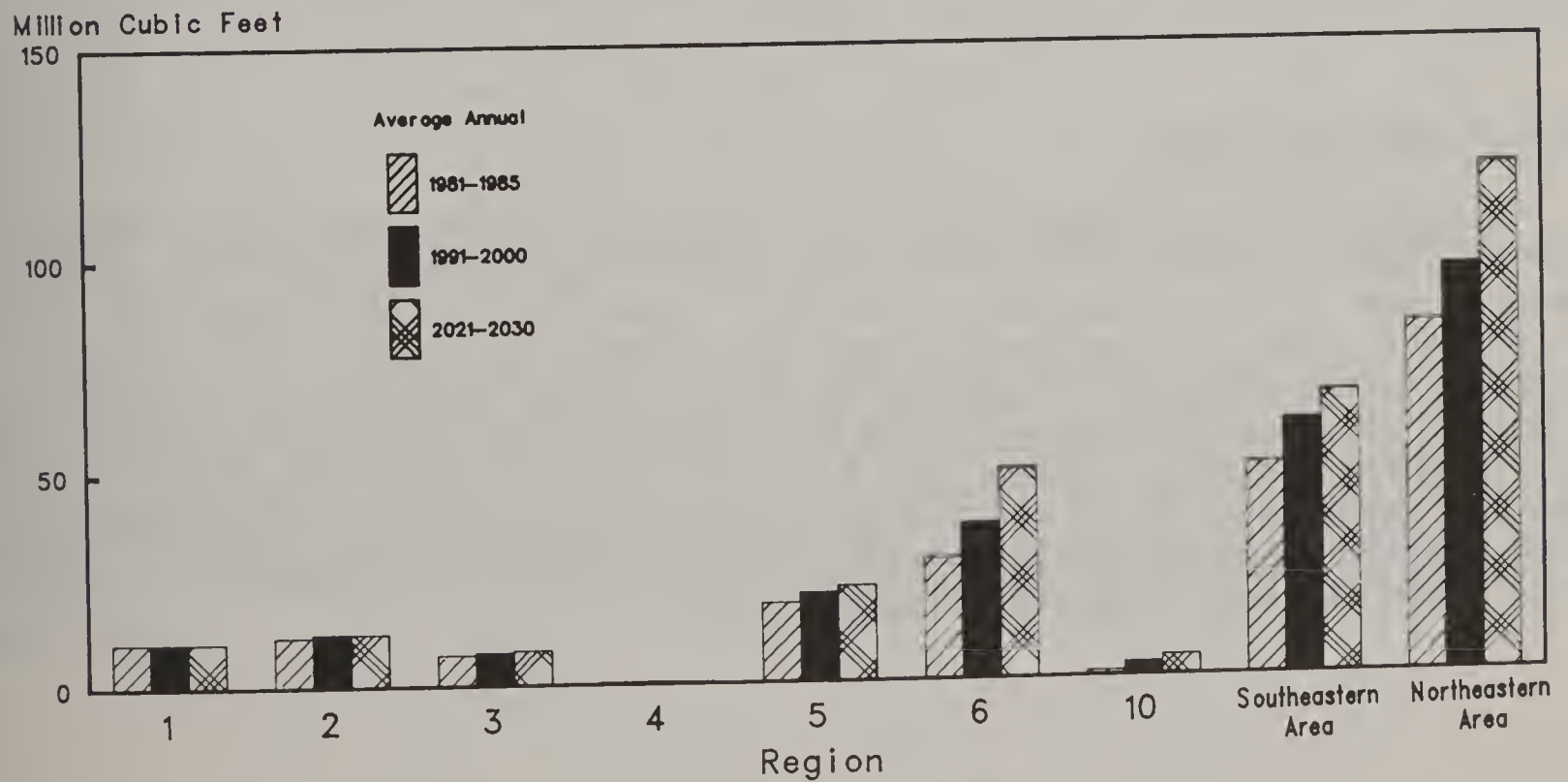


Figure 3.85

Regional Estimates-Alternative 3 Improved Wood Utilization (S&PF)



using wood residues as an energy source. Results would be directed to energy self-sufficiency in the wood-using industry. Pilot plant demonstrations would be conducted on the feasibility of utilizing the complete tree for the manufacture of COMPLY panels and framing products. Research would develop mechanical property data for the major hardwood species. These data would encourage use of hardwoods for structural lumber.

Forest engineering research: Demonstrations would be conducted on the results of cooperative efforts with NFS and S&PF to provide energy, fiber, and solid products from the National Forests. Benefits associated with establishing energy farms on private lands would be evaluated and provided. Benefits of maintenance and protection of forests through proper harvesting and wood transport would also be evaluated and published.

Water

National Goals

Technical water support services, NFS.--Provide range of technical water support services needed to maintain and selectively improve water quality and water yield.

Water quality improvement, NFS.--Implement water resource improvements to improve water quality.

Water yield, NFS.--Implement water resource improvements to increase water yield in water-short areas.

Cooperation with others, S&PF.--Encourage coordinated planning and implementation of watershed and flood prevention activities through assistance, cooperation, and involvement of private forest landowners and Federal, State, and local organizations responsible for water.

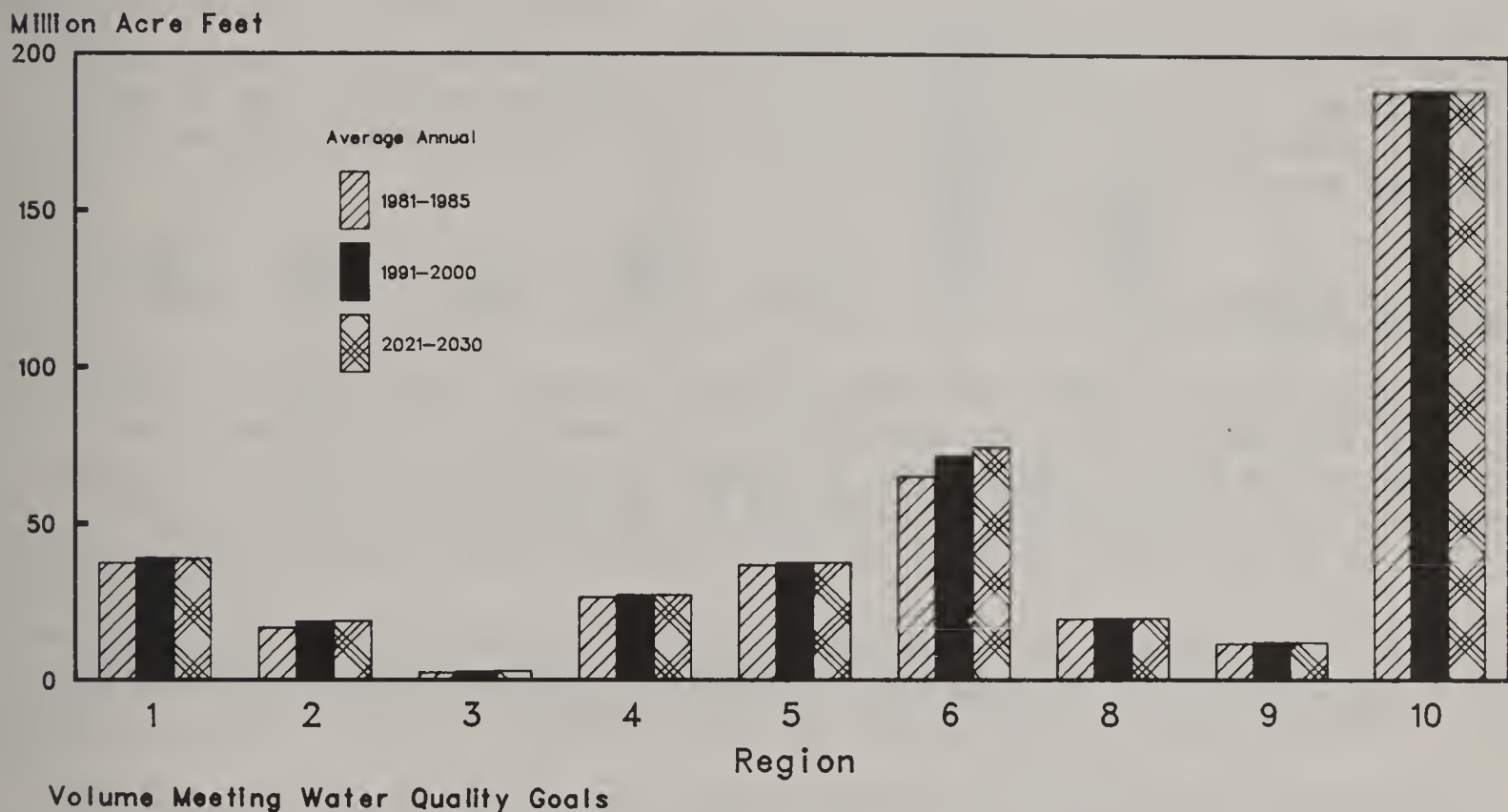
Water resource research.--Increase development and use of scientific knowledge to provide onsite water resources of adequate quantity and quality for recreation and propagation of game fish and wildlife; increase water yields for offsite uses in water-short areas; eliminate discharge of pollutants with emphasis on maintaining aquatic ecosystems and water resource features of exceptional ecological value.

Outputs and Activities

National Forest System.--Water activities in this element are in addition to support services required to provide for nondegradation of the water resource due to other resource activities. Water quality goals would be met for all water yielded from the National Forests by the year 2000. Water resource inventories would increase to provide for a moderate increase in outputs. Resource improvement would stress maintenance of water quality with selected projects implemented to increase water yield. This level of resource improvement would require an increased level of improvement maintenance. Water quantity and percentage of water volume meeting water quality goals would increase slightly (figure 3.87).

Figure 3.87

Regional Estimates-Alternative 3 Water Quality (NFS)



State and Private Forestry.--Moderately increased technical and financial assistance would be available for protecting and improving the quality, quantity, and timing of water yields from non-Federal forest lands. This assistance would be directed to the highest priority plans and practices to improve water quality, incorporate watershed management principles in forest resources planning, develop best management practices, improve municipal watersheds, improve streamside management, and implement onsite and offsite soil stabilization practices.

Research.--Research would determine the water resource amenities and requirements for recreation and propagation of fish and wildlife, especially threatened and endangered species. Hydrologic processes would be quantified and the effects of management practices on water yield and distribution evaluated. Nonpoint-source pollution from forest and range ecosystems would be assessed; its effect on aquatic ecosystems evaluated; and control measures developed.

Minerals

National Goals

Operations, NFS.--Maintain moderate capability to act on mineral proposals. Integrate proposals and resulting activities with other resource plans and needs. Improve capability to act on proposals relating to energy minerals.

Assistance to States and private landowners, S&PF.--Provide moderate level of technical assistance to States and private landowners for planning related to mineral operations and reclamation of disturbed lands.

Surface environment and mining research.--Develop and use scientific knowledge to meet water quality standards for streamflow from mined areas; improve esthetics, recreation opportunities, wildlife habitat, and range and timber productivity of selected mined areas; and maintain integrity of undisturbed ecosystems near mined areas.

Outputs and Activities

National Forest System.--Program direction under Alternative 3 would moderately increase efforts to accommodate all requests to prospect, develop, and remove mineral resources in compliance with all applicable laws. The number of operating plans is expected to increase from 17,882 in the year 1981 to about 35,400 by 2030 at this program level (figure 3.88).

Under Alternative 3, in contrast to Alternative 1, information programs mental protection would be reduced. Moderately increased efforts would be made to include minerals information in land management plans.

Where there are choices that have to be made regarding priorities for approving mineral leases or permit applications, energy-related minerals would be favored at the expense of hardrock and common variety minerals.

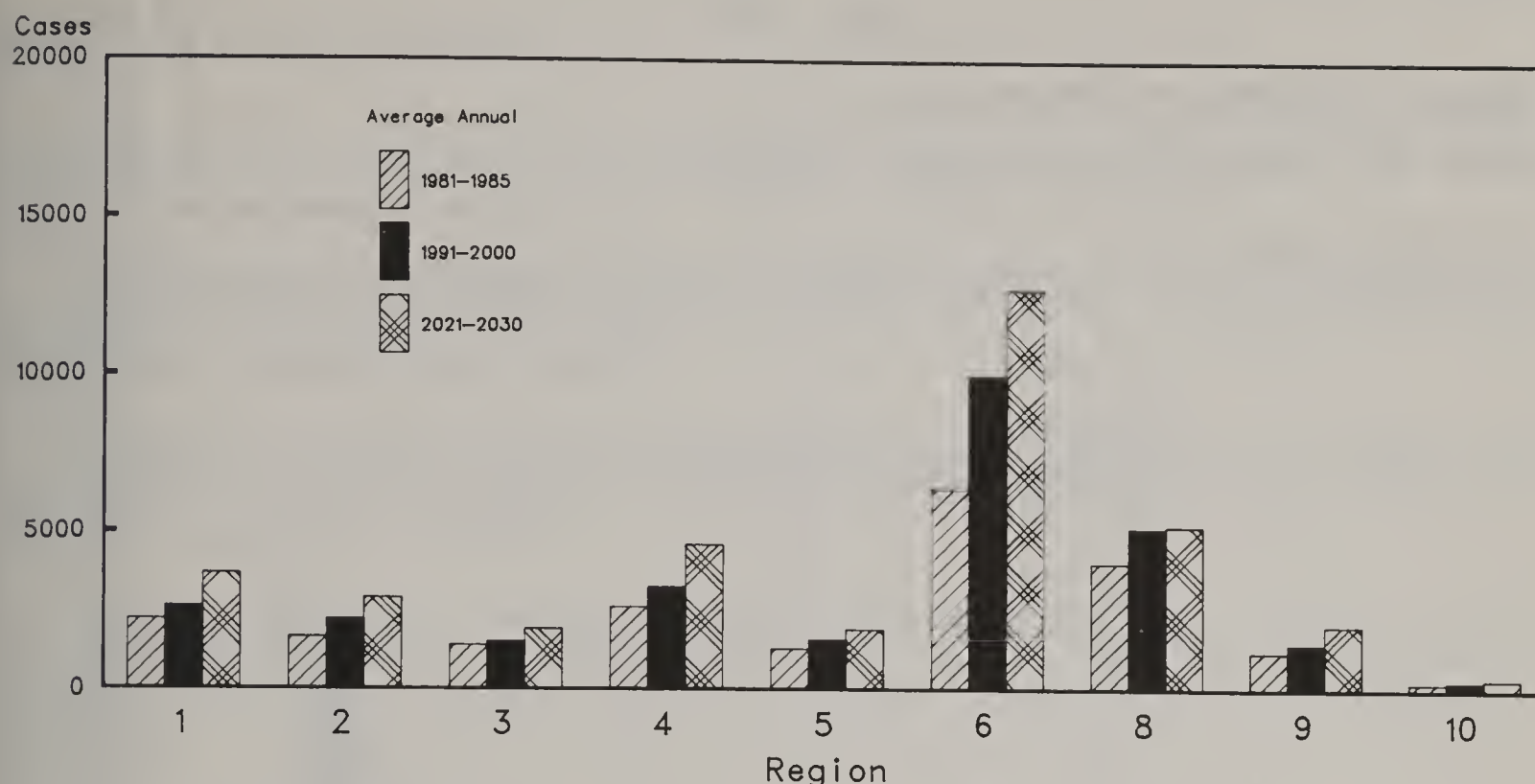
Alternative 3 is directed to increasing, to the extent possible, all ranges of mineral and mineral-related work above present levels, except that minerals claim validity examinations likely would not increase significantly.

State and Private Forestry.--Technical assistance to State forestry agencies for reclamation of surface mined lands would be provided at a moderate level. Coordination with other agencies would be accomplished through existing channels.

Research.--Research would evaluate the chemical and physical properties of mine wastes, identify potential pollutants including heavy metals, and flow water quality standards are met. Techniques would be developed to rehabilitate sites to improve esthetic and recreational opportunities, wildlife habitat, and production of timber and forage. Associated undisturbed ecosystems and sites of ecological significance would be identified and techniques developed for their protection. Some work would be done to develop occurrence models and exploration and development prediction tools.

Regional Estimates-Alternative 3

Mineral Leases and Permits (NFS)



Human and Community Development

National Goals

Employment and training programs (NFS, S&PF, and Research).--Slightly increase employment and training programs for youth, older Americans, and the disadvantaged.

Urban and community forestry cooperation, S&PF.--Moderately increase cooperative urban forestry programs.

Urban and community forestry research.--Moderately increase development and use of scientific knowledge to assess human benefits of urban forests; understand biological and physical processes of urban forests; maintain, utilize, and protect urban forests; and integrate urban forest management and planning into the total urban development process.

Outputs and Activities

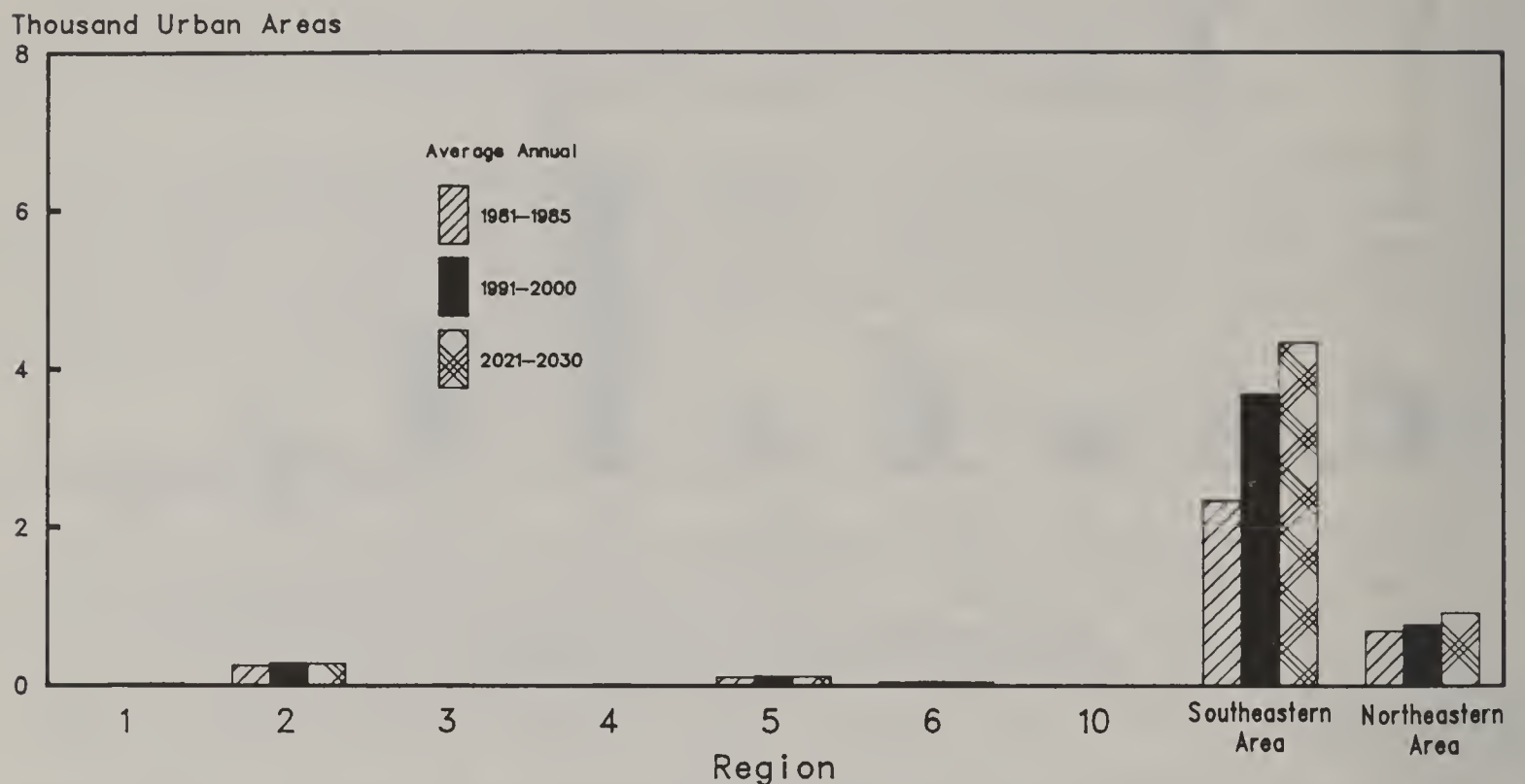
National Forest System.--Under Alternative 3, there would be a slightly enlarged version of fiscal year 1978 programs which would call for an increase in the number of enrollees while using fiscal year 1978 staffing levels.

Under Alternative 3, there would be an increase in funding for State and local government grant programs. In addition, the Human Resource Programs Staff would aid local authorities in setting up human resource programs and would encourage cooperative agreements.

State and Private Forestry.--Moderate increases in financial and technical assistance to States and cities for urban and community forestry would

Figure 3.89

Regional Estimates-Alternative 3 Urban and Community Forestry (S&PF)



provide some additional Federal encouragement for cooperative efforts to plan urban forestry programs, to maintain urban trees, and to utilize wood from trees in urban areas. Federal assistance would be directed to selected high priority areas and to short-term critical needs rather than long-term goals and objectives. Special efforts would be made to direct this additional assistance to smaller communities that lack sufficient urban forestry assistance in the private sector. Regional variations in the anticipated number of urban areas to be assisted are illustrated in figure 3.89.

Research.--Research would produce information on how urban and community forests improve property values, employment and conservation of energy. Research would determine how urban and community forests can be managed for visual quality, air quality, water quality and quantity, wastewater disposal systems, urban wildlife, and recreation. Research would develop processes to select and develop urban trees; and plant, grow, improve, protect, maintain, and replace urban and community forests. Research would create strategies to integrate urban forests with urban planning programs, develop information exchange systems, and monitor technology related to urban forestry programs.

National Goals

Protection, NFS.--Provide moderate levels of insect and disease management, fire use and management, and law enforcement activities.

Air quality, NFS.--Provide a moderate level of air quality management, with emphasis on studying and managing air quality-related values and emissions from management activities. Improve residue management.

Cooperation with others, S&PF.--Provide a moderate level of technical assistance, cooperation, and cost sharing for insect and disease control and rural fire prevention and control.

Insects, disease, and fire management systems research.--Increase basic and applied research programs to develop new and improved insect, disease, and fire management systems.

Social, economic, and environmental effects research.--Increase basic and applied research on methods to identify, assess, and predict net social, economic, and environmental effects of insects, diseases, air pollutants, and fire.

Outputs and Activities

National Forest System.--Intensive fire protection would be afforded to wildland near urban areas, critical watersheds, and other high value lands. Modified protection levels would be given to other lands to meet land management objectives for moderate levels of output.

Fuels management efforts would encourage wood residue utilization, require treatment of all activity created fuel, and treat natural fuels in areas of high fire incidence.

Fire management outputs on NFS lands are reflected in the Fire Management Effectiveness Index, which is a measure of the cost of protection plus the net damages per thousand acres protected. Estimates for the nine NFS Regions are shown in figure 3.90. Regional data area also shown for fuelbreaks and fuel treatments in figure 3.91.

Significant aspects of Alternative 3:

- The index value is moderate, declining to well below initial 1981 investment levels by 2030. This index effectiveness is second only to Alternative 1, with lower operational and investment costs than Alternative 1 and low damages.
- Air quality management would provide for a moderate level of outputs.
- Technical assistance, technology transfer, new pilot projects, and suppression activities in insect and disease management would be directed toward selected pests having a major adverse impact on meeting levels of outputs.

Figure 3.90

Regional Estimates-Alternative 3 Fire Management Effectiveness Index (NFS)

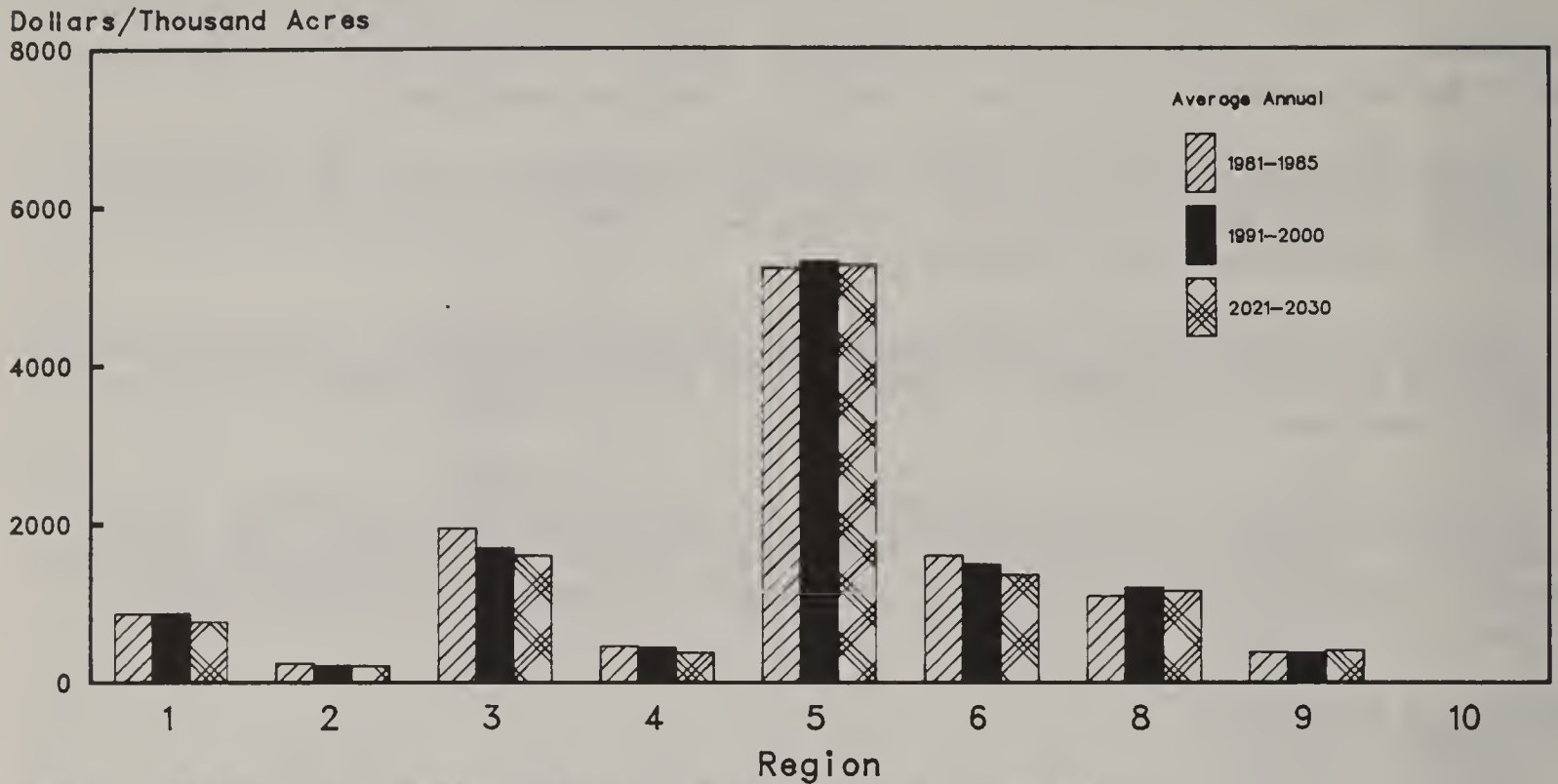
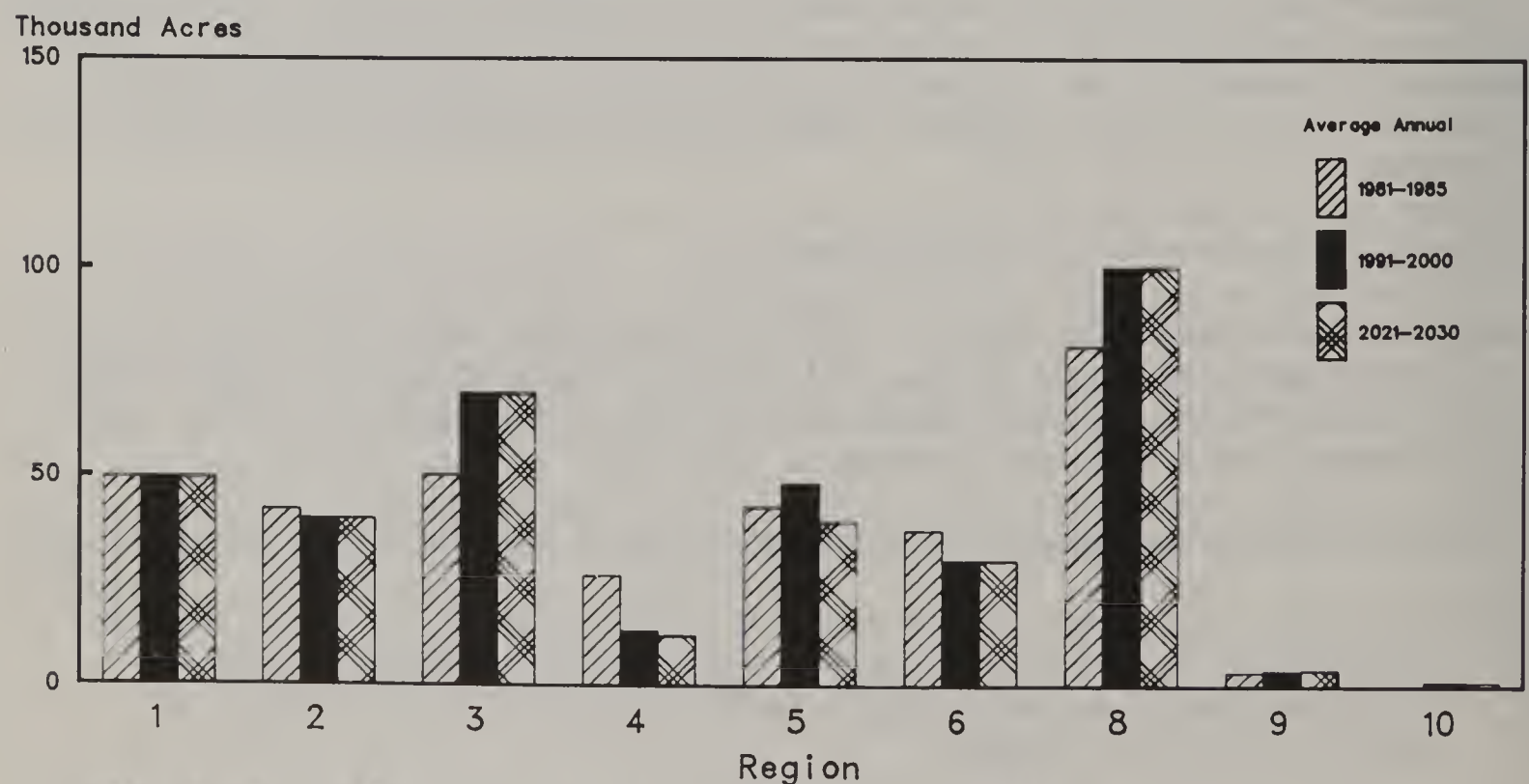


Figure 3.91

Regional Estimates-Alternative 3 Fuelbreaks and Fuel Treatment (NFS)



- Law enforcement activities would provide for the enforcement of all laws and regulations to the extent necessary to meet the moderate levels of outputs.

State and Private Forestry.--Insect and disease control: Direct actions on National Forest System lands and cooperative actions on other public and private forest lands for insect and disease prevention, detection, evaluation and control would be moderately increased. Regional variations in acres surveyed are illustrated in figure 3.92. Emphasis would be placed on detection, evaluation, and loss assessment surveys and on inputs to land management and resource plans. Prevention to reduce insect and disease losses would be accomplished through silvicultural thinning techniques and the implementation of prevention measures described in resource plans and cooperative program documents. New technical assistance and cost-sharing programs, such as urban tree protection and protection of wood in use, would be partially implemented. Integrated pest management would be strengthened. Protection activities would be concentrated on high value timber, recreation, and watershed areas.

Rural fire prevention and control: Moderate levels of Federal financial, technical, and related assistance for rural fire prevention and control would not significantly help State Foresters, or equivalent State officials, obtain the goals outlined in their 1974 Fire Protection Analysis. Intensive fire protection would be essentially limited to the urban interface, high value watersheds, and other high value lands. Implementation of new technical developments would be restricted to those of relatively low cost. Neither environmental conditions nor incentives for forestry investments would be significantly altered in the short term. Assistance provided for rural community fire protection is expressed in terms of approved applications in figure 3.93. Anticipated regional fire losses are illustrated in figure 3.94. In Alaska (Region 10), reported acreage burned is expected to continue to rise, due to large increases in the area to be included within the State fire protection program, without commensurate increases in program size.

Research.--Fire and atmospheric sciences research: Scientific knowledge and technology would be developed and tested that would add to integrated systems and strategies for fire control and would provide methods for evaluating these systems. This would permit the development of improved fire prevention and fire use techniques and provide for modern research outputs. These research results would assist in providing moderate levels of both market and nonmarket commodity production from the National Forest System and from State and private forests.

Forest insect and disease research: Basic and applied research would be increased on methods to identify, assess, and predict the net social, economic, and environmental effects of insects and diseases commensurate with moderate levels of market and nonmarket outputs. Effects of biotic and abiotic factors on pest populations would be studied. Research on selected pests would stress integrated pest management, behavioral chemicals, microbial insecticides, safer chemicals, silvicultural control, and genetic resistance. Improved decisionmaking guidelines for land managers would be verified and published for field use.

Figure 3.92

Regional Estimates-Alternative 3 Insect and Disease Surveys (S&PF)

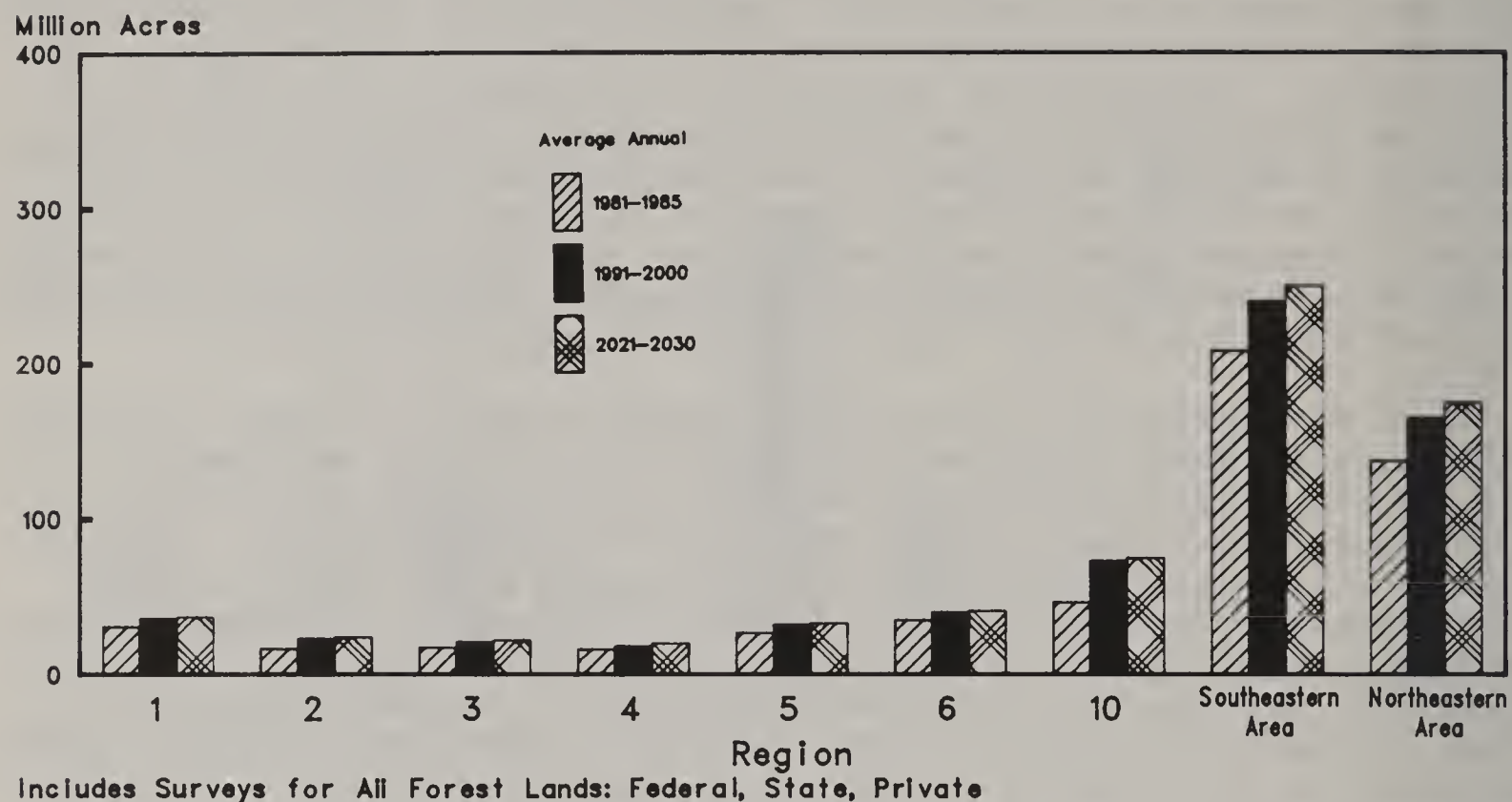


Figure 3.93

Regional Estimates-Alternative 3 Rural Community Fire Protection (S&PF)

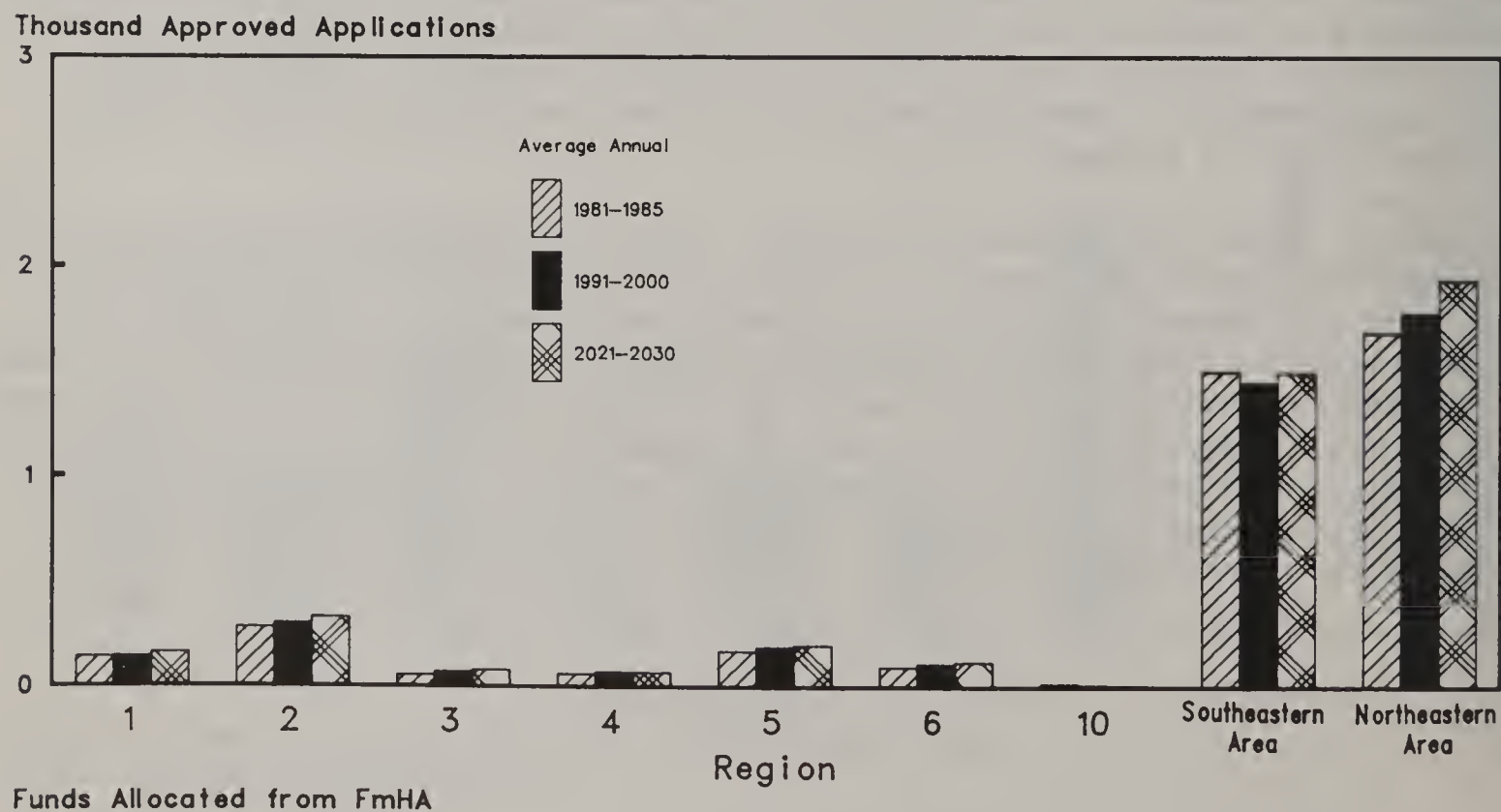
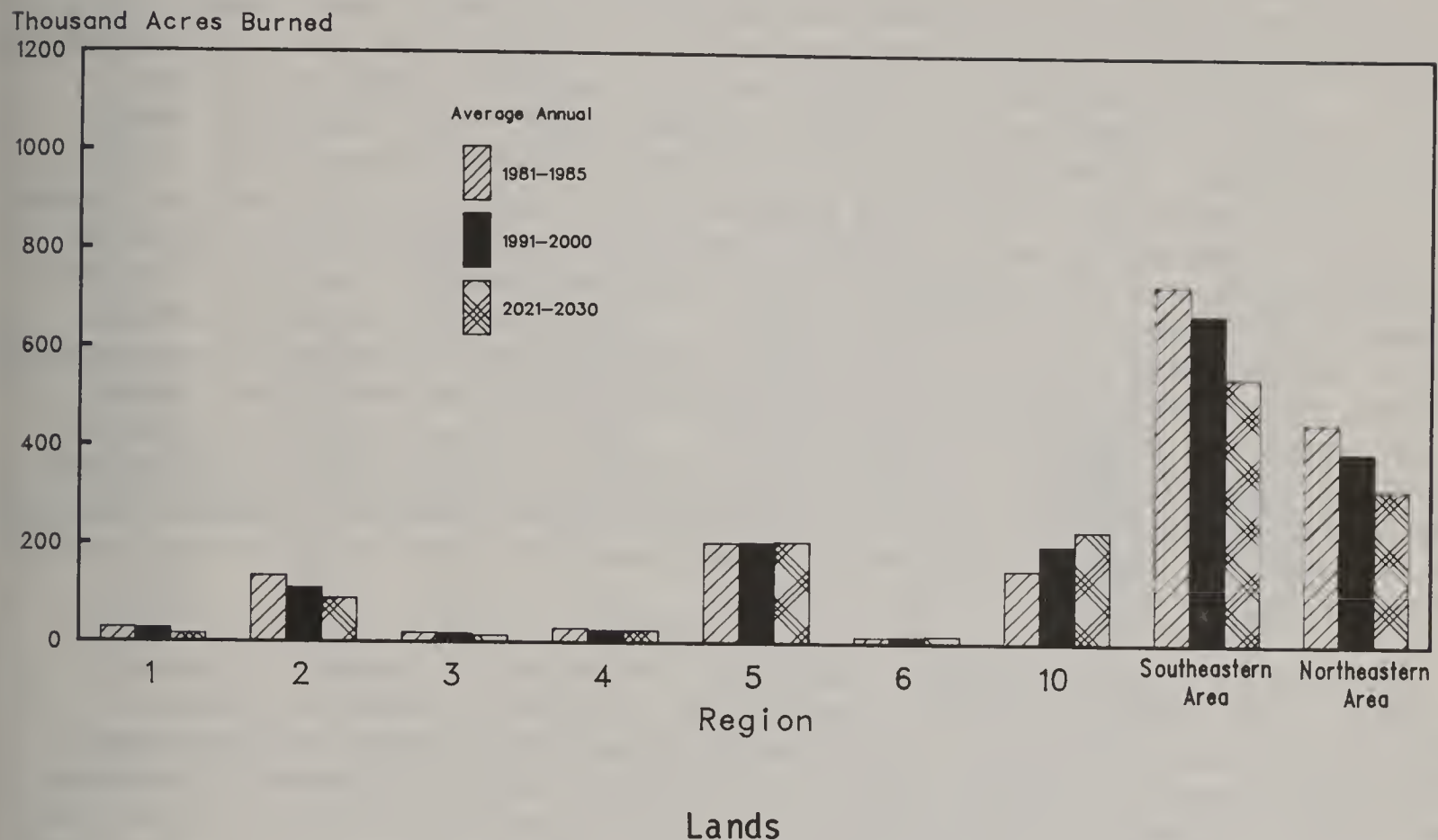


Figure 3.94

Regional Estimates-Alternative 3

Fire Loss on Protected Area (S&PF)



National Goals

Land management planning, NFS.--Moderately intensify land and resource management planning and related special studies.

Land status, NFS.--Provide moderate level of landline location and marking, title claims, land exchange, and land acquisition. Complete and maintain land status data system records to meet management planning and program commitments. Facilitate early completion of Native and State land selections in Alaska.

Special land uses, NFS.--Moderately increase efforts to plan and provide for special land uses.

Cooperation in State forest resources planning, S&PF.--Moderately increase cooperation and technical assistance to States for forest resources planning.

Forest resources economics research.--Develop and use scientific knowledge to improve economic analyses of multiresource management and use alternatives on all forest and range lands.

Renewable resource evaluation research.--Develop and use scientific knowledge to inventory and analyze all renewable resources on a 10-year cycle.

Outputs and Activities

National Forest System.--Land and resource management plans would be completed on all lands within the National Forest System by the mandatory October 1985 completion date. Planning and special studies will be moderately accelerated to complete planning before the mandatory date and intensified to the reliability needed to support the planned resource development. Land-line location, marking, and status would be at a moderate level needed to support the moderate resource outputs and to discourage new and resolve current trespass. Title claims activity would be at a moderate level as private owners' efforts to develop use of their lands reveal title conflicts which must be resolved. Land purchases, using Land and Water Conservation funds, would be at a high level until the program ends in 1989. Using regular (Weeks Act) funds, lands would be purchased to meet critical needs and to improve manageability of eastern National Forests, but many tracts needed to optimize management efficiency would not be bought. Land exchanges and adjustments would be at a moderate level to gain the efficiencies of improved landownership patterns, to support dispersed recreation and activities near urban centers, and for watershed protection (figure 3.95). Special land uses are primarily externally imposed. Needs of others for such uses of National Forest System lands would increase as a result of increases in the national economy. Reasonable requests for special uses would be accommodated, and existing uses would be managed to protect the public interest.

State and Private Forestry.--Moderate increases in Federal financial, technical, and related assistance to States for forest resource planning would provide some additional incentive to assemble, analyze, display, and report State forest resources data, train forest resource planners, and consider forestry aspects during natural resource planning at the State and Federal levels. Technical rather than financial assistance would be emphasized, although some funds to employ, train, and support State forest resource planners or to contract for such services would be available. State forest resource plans, dependent upon Federal assistance for even more detailed sub-State forest resources planning, would also be available. Coordination among State forest resources planning, National Forest System land management planning, and RPA would be strengthened. Figure 3.96 illustrates, on a Regional basis, the acreage for which State forest resources plans would be prepared. Figure 3.97 shows the acreage included in multiresource forest management plans prepared for individual landowners.

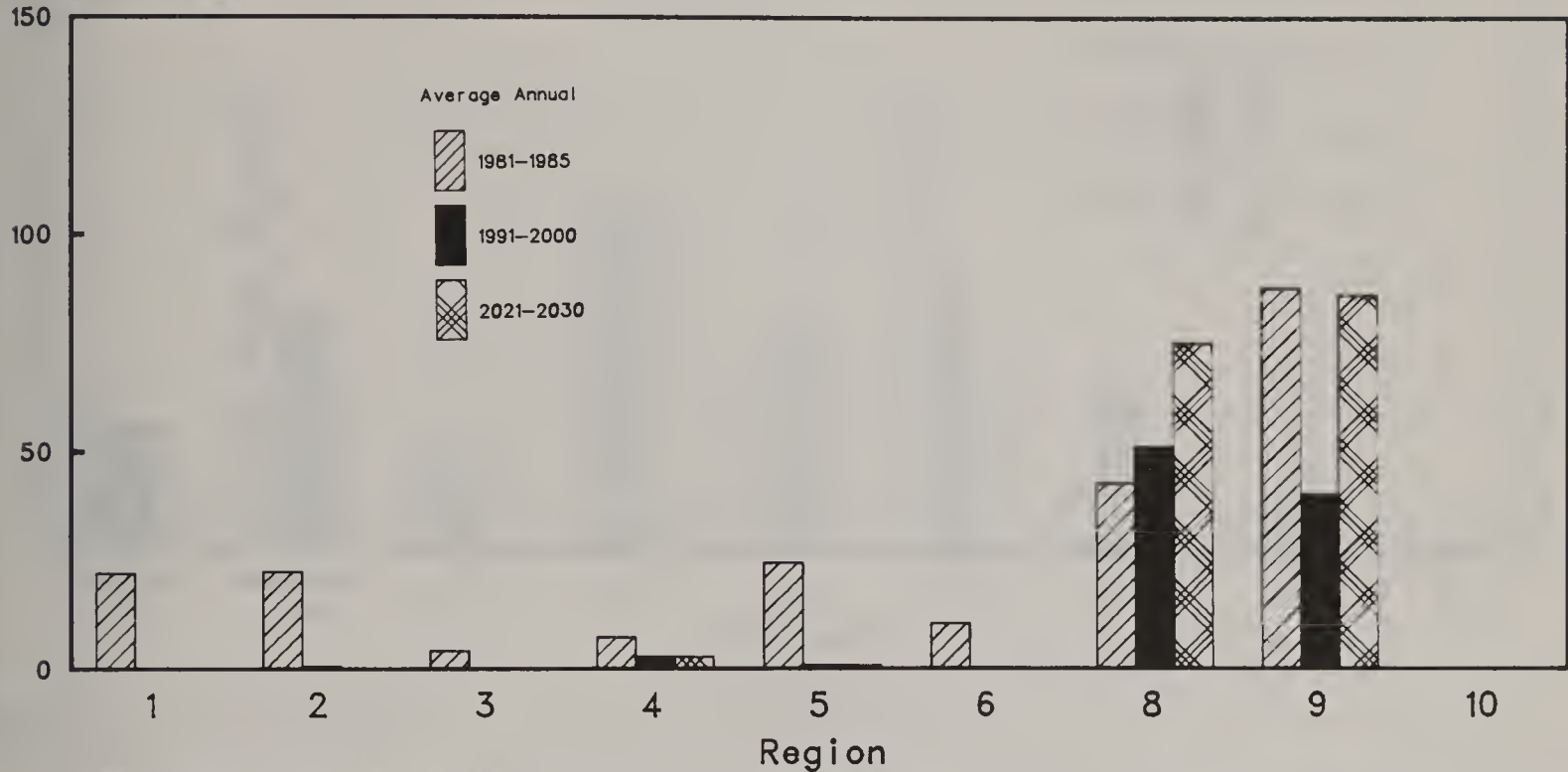
Research.--Forest resources economics research: Improved knowledge would be developed for economic analyses of management alternatives to maintain timber and forage production and increase nonmarket outputs from National Forest lands and to increase all outputs from State and private lands.

Renewable resources evaluation research: Improved techniques would be developed and tested for conducting inventories and analyses to specifications and standards required for intensified management of all forest and range resources. Inventories and analyses of land, forage, recreation resources, wildlife habitat, and water would provide information comparable in accuracy and reliability to that obtained for timber. Inventories and analyses would be completed at 10-year intervals for improved reliability and usefulness in land and resource management planning.

Figure 3.95

Regional Estimates-Alternative 3 Land Purchase and Acquisition (NFS)

Thousand Acres

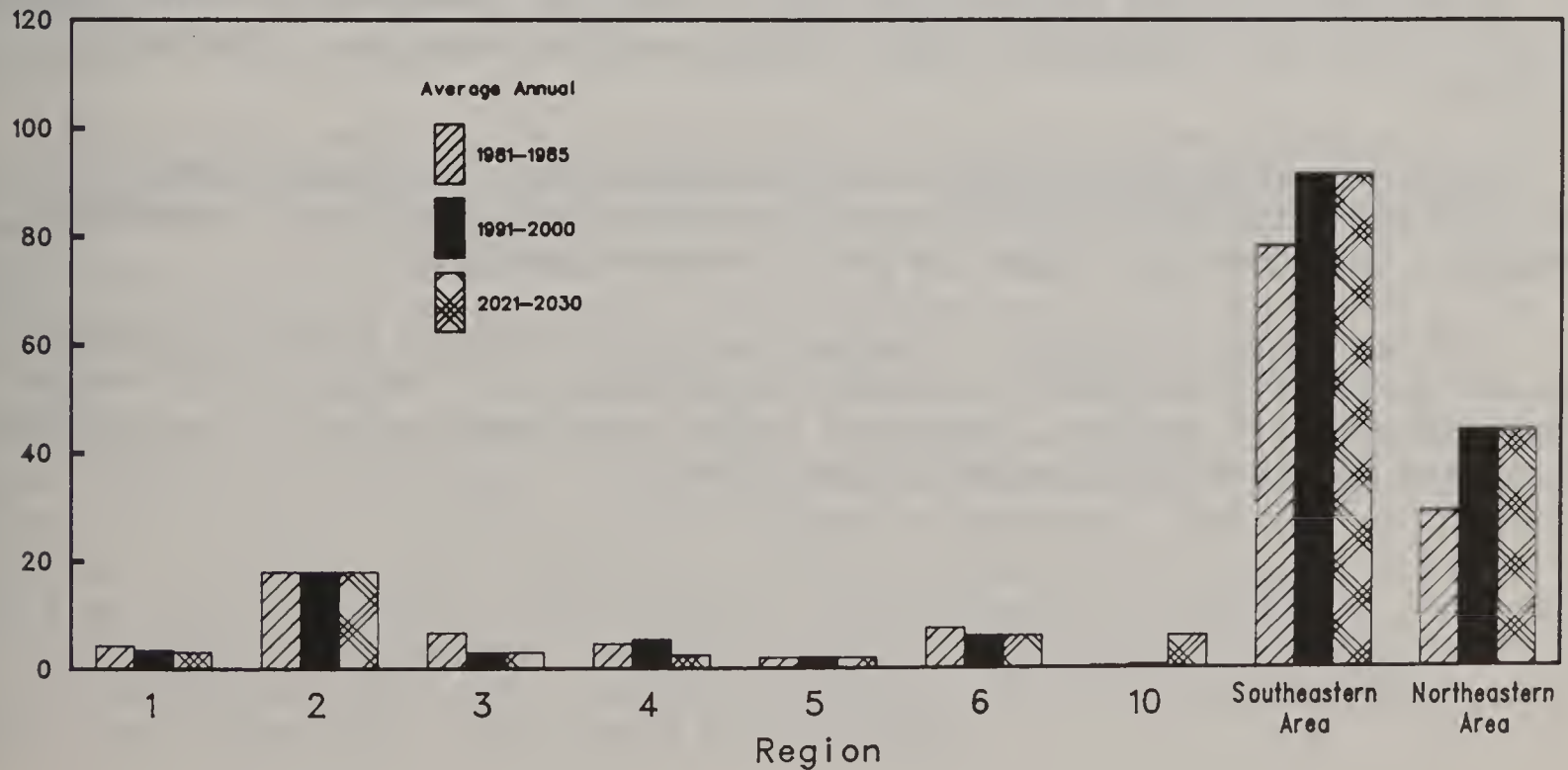


Includes Land and Water Conservation Fund Purchases
Excludes Land Exchanges

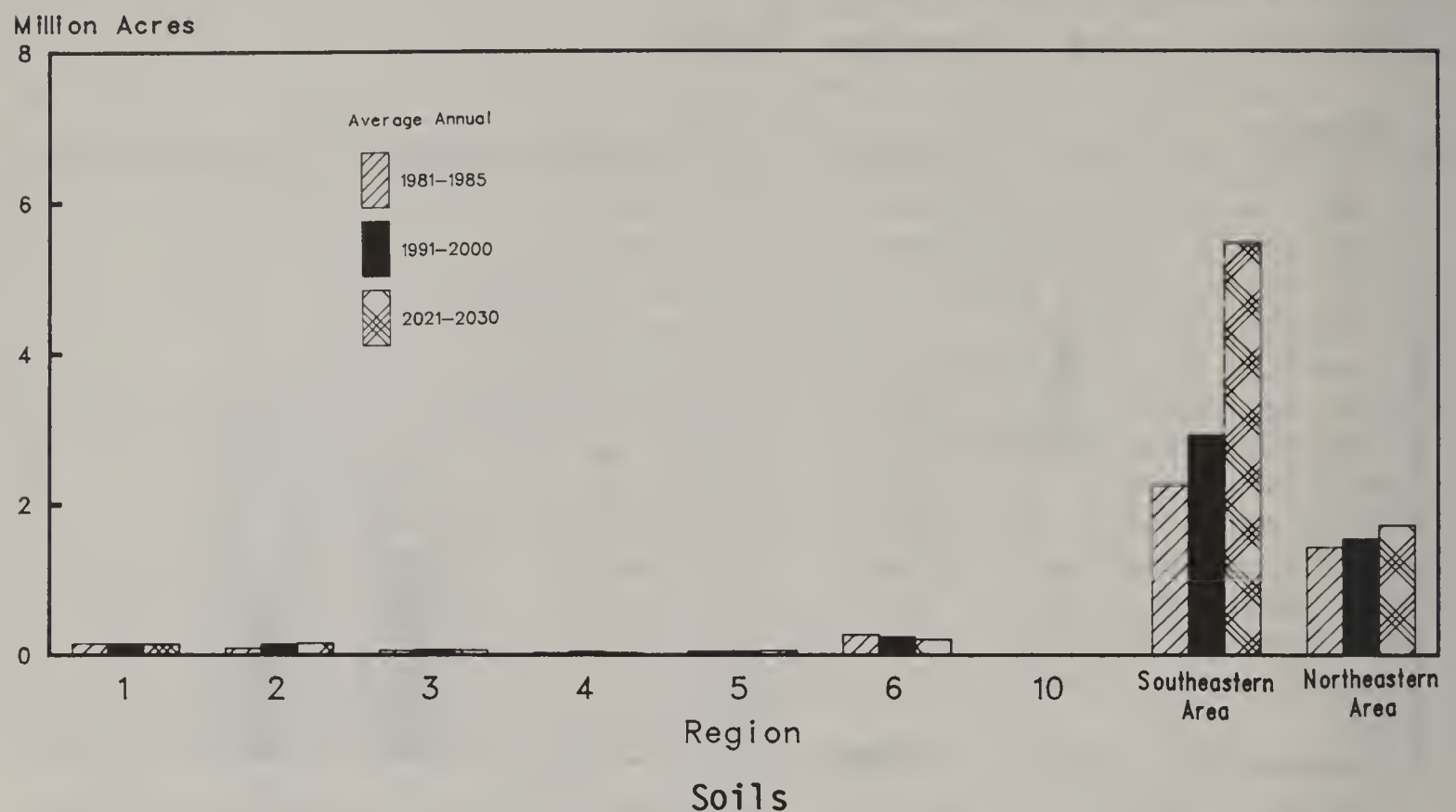
Figure 3.96

Regional Estimates-Alternative 3 State Forest Resource Planning (S&PF)

Million Acres



Regional Estimates-Alternative 3 Landowner Forest Management Plans (S&PF)



National Goals

Technical soil support services, NFS.--Provide technical soil services needed to maintain and selectively improve soil productivity.

Soil resource improvement, NFS.--Selectively implement soil resource improvements to enhance soil productivity.

Soil inventories, NFS.--Provide moderate-level soil inventory data to improve soil productivity, where needed.

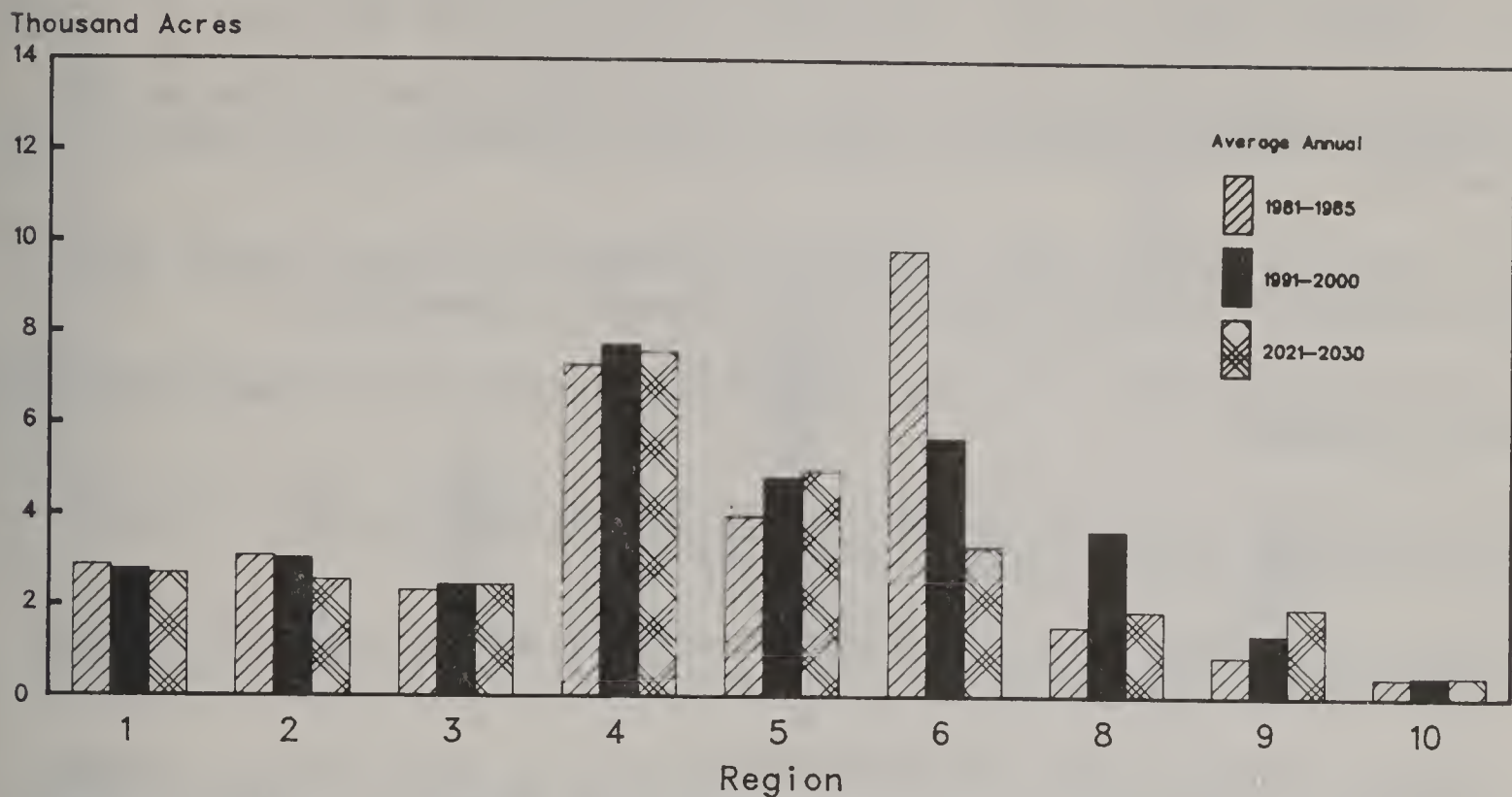
Abandoned mineland reclamation, NFS.--Provide for moderate-level reclamation efforts on lands where other resource values have been adversely impacted.

Technical assistance, S&PF.--Provide moderately increased technical assistance and training in soil data interpretations for forest management purposes, in cooperation with the Soil Conservation Service.

Soil management research.--Conduct moderate research effort to develop and use scientific knowledge necessary to provide soil resources for recreation and wildlife habitat, increased timber and range production on selected sites, and maintenance of aquatic ecosystems.

Regional Estimates-Alternative 3

Soil and Water Quality Improvement (NFS)



Outputs and Activities

National Forest System.--Soil activities in this element are in addition to support services required to maintain soil productivity and provide for nondegradation of the soil resource due to other resource activities. Soil resource inventories would increase to provide for a moderate increase in outputs. Maintenance of soil productivity would be stressed, but selected projects to increase timber and range outputs would be undertaken (figure 3.98).

State and Private Forestry.--Moderately increased technical assistance and training in soil data interpretation for forest management would be offered to State Foresters or similar State officials and through them to owners and managers of private forest lands. These interpretations would include information on forest productivity, erosion hazard ratings, road location, and harvesting and site preparation techniques to protect the soil.

Cooperative technical assistance for prime forest land mapping in high priority areas would be provided by four field units (SA, NA, and the Intermountain and Alaska Regions). Five field units (the Northern, Rocky Mountain, Southwestern, Pacific Southwest, and Pacific Northwest Regions) would incorporate assistance for prime forest land mapping within the State forest resources planning program in the lands element.

Research.--Research would determine soil requirements of recreational sites and wildlife habitats. Techniques would be developed to reduce soil erosion, to maintain terrestrial and aquatic ecosystems, and improve stream-flow water quality. Soil properties limiting timber and forage production would be evaluated, soils with potential for increased productivity identified, and techniques developed to improve productivity on selected sites by fertilization, drainage, etc. Soil resources necessary to maintain ecological, scientific, and educational sites would be evaluated.

Facilities

National Goals

Utility system, NFS.--Step up installation of new utility systems to support resource element goals. Implement new methods of delivery.

Building construction, NFS.--Step up new building construction to support resource outputs, health and safety, equal opportunity, and energy conservation.

Building maintenance, NFS.--Maintain buildings to current health and safety standards. Continue conversion for energy conservation.

Communications, NFS.--Upgrade communications systems with technologically advanced equipment.

Transportation including roads and trails construction, NFS.--Install complete principal transportation network by 2010.

Water impoundments, NFS.--Upgrade water impoundments requiring restoration to meet safety standards.

Research construction.--Increase construction on new Research laboratories and other support facilities to support major Research initiatives and to promote health and safety, equal opportunity programs, and energy conservation. Continue conversion for energy conservation.

Outputs and Activities

National Forest System.--Develop increasing programs of capital investments for replacement of facilities to meet current health and safety needs and promote energy conservation.

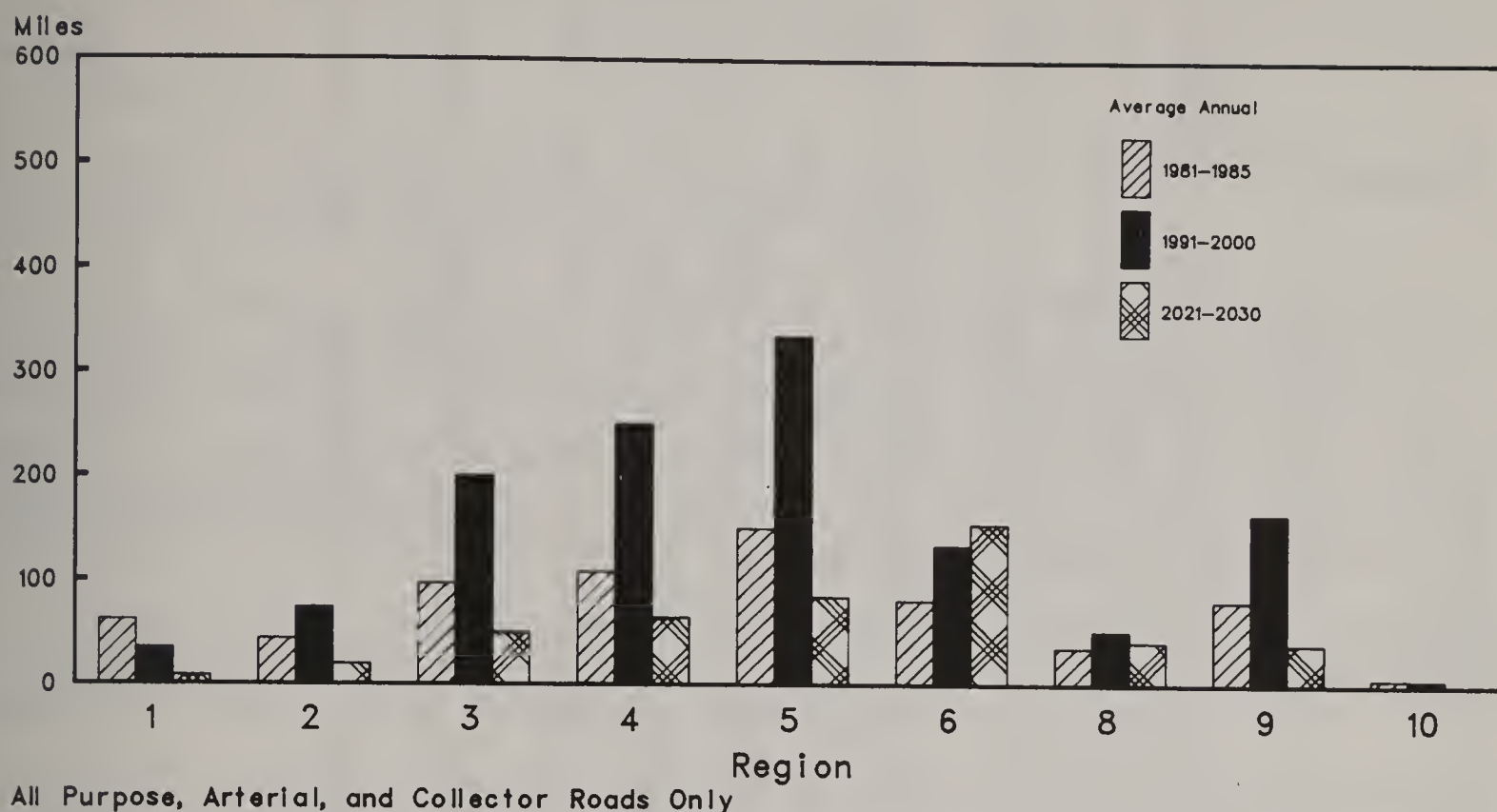
The physical plant would be expanded and improved consistent with installation of new management systems and increases in resource outputs to meet demands. Increased use of facilities and related health and safety concerns would be handled on a current basis to prevent deterioration or accumulation of needed but unfunded work. New technology would be applied as available.

Figure 3.99 displays the work to be accomplished by Regions to complete their individual principal transportation systems by the year 2010. Additional miles of roads to be constructed for specific resource activities are contained in the individual program element outputs, activities, and cost figures.

Research.--New research laboratories and other facilities would be constructed to support major new research programs and to promote health and safety, equal opportunity programs, and energy conservation.

Regional Estimates-Alternative 3

Road Construction/Reconstruction (NFS)



Environmental Effects

The environmental effects of this Alternative--physical-biological, economic, and social--are summarized on the following pages. For a more detailed description of these effects, see chapter 4.

Physical-Biological Effects

Under Alternative 3, water quality goals would be met and yields would be slightly increased. Air quality would only slightly decrease in the short term, and would increase in the long term as a result of reductions in emission. Visual quality would be impacted in the short term as a result of changes in color and texture but these impacts would subside in the long term. Endangered and threatened species would be maintained or enhanced; none would be adversely affected. Most of the other management indicator species would also be maintained or enhanced, although four would decline. Cultural resources would be moderately impacted.

Economic Effects

The present net worth for the total National Forest System under Alternative 3 over 50 years is \$44.9 billion discounted at 7-1/8 percent (table 3.12).

Timber and water provide the largest net benefits. Together, these elements account for over 62 percent of the present net worth. Other elements with large positive values are recreation, minerals, wildlife and fish. Range is the only element with a negative value, consisting of \$1 million over the 50-year period.

Table 3.12.--NFS present net worth for Alternative 3
discounted at 7-1/8 percent by resource element & region

(Million Dollars)											
Element	NFS Regions										Total by element
	1	2	3	4	5	6	8	9	10		
Recreation	141	963	387	763	2,787	537	1,278	635	137	7,628	
Wilderness	87	446	78	208	452	72	10	244	2	1,599	
Wildlife & Fish	285	792	449	423	301	517	298	300	181	3,546	
Range	35	66	-5	-61	-9	-11	-4	-12	--	-1	
Timber	-95	-438	-47	-192	3,859	13,870	638	-646	-636	16,313	
Water	4,158	1,276	98	1,716	1,151	1,393	254	32	1,347	11,425	
Minerals 1 /	230	1,475	381	1,318	2	-75	120	349	608	4,408	
Total by Region	4,841	4,580	1,341	4,175	8,543	16,303	2,594	902	1,639	44,918	

1/ Value for locatable materials other than uranium and thorium was not determined. This primarily impacts the values in Region 5.

Recreation, wilderness, wildlife and fish, and water have positive values in all Regions. Regions making sizeable contributions include the Pacific Southwest (Region 5), which provides 37 percent of the recreation value. Also, Region 2 of the Rocky Mountains and the Pacific Southwest Region (Region 5) contribute over 56 percent of wilderness values (28 and 28 percent, respectively). Region 1 of the Rocky Mountains produces over 36 percent of the water value.

Timber programs on the Pacific Coast (Regions 6 and 5) are responsible for large positive values in the timber element.

For minerals, Regions 2, 3, and 4 of the Rocky Mountains contribute over 73 percent of the present net worth (34, 9, and 30 percent, respectively). The large benefits in these Regions are due to energy-related production.

Returns to Government.--Returns expected from gross sale (or lease) of National Forest System resources for Alternative 3 are \$1,700 million in 1981, \$2,277 million in 1985, \$2,939 million in 1995, and \$5,955 million in 2025.

These returns include cash payments, required deposits from purchasers to finance activities resulting from timber sales, (such as Knutson-Vandenburg deposits), and credits allowed for work performed by the purchasers.

The Alternative 3 annual revenues (in either dollars or credits) are as follows:

(Million Dollars)

Activity	1981	1985	1995	2025
Recreation	15	18	21	26
Grazing	24	19	22	26
Timber	1,496	1,950	2,410	4,856
Minerals NFF <u>1/</u>	<u>22</u>	<u>37</u>	<u>49</u>	<u>89</u>
Total NFF <u>2/</u>	1,557	2,024	2,502	4,997
Minerals, BLM <u>3/</u>	<u>143</u>	<u>253</u>	<u>437</u>	<u>958</u>
Total Government	1,700	2,277	2,939	5,955

1/ (NFF) National Forest Fund.

2/ Historically, approximately 25 percent of the National Forest receipts have been paid to States for redistribution to local county governments. Payments are also made by BLM. These payments are in lieu of taxes.

3/ Mineral royalties collected from public domain National Forest System lands and reported by Bureau of Land Management.

Social Effects

The effects of Alternative 3 on the existing social structure would not be very great in comparison with effects of the other Alternatives. Regional and local nonmetropolitan areas dependent on Forest Service program outputs and services would be most affected, but the impact would probably be easily assimilated by most affected areas. These include the West and Southwest and some areas in the North. The key social variables most likely to be affected and noticed would include community economies, opportunities for leisure, community identity, and opportunities for minorities. Effects from Alternative 3 would be most difficult to discern in areas of rapid growth and associated change.

This Alternative was considered to forego the fewest future choices. For "conflict polarization," this Alternative was only surpassed by Alternative 5 for being the least polarizing. (See chapter 4 for definition.)

ALTERNATIVE PROGRAM DIRECTION 4

(Forest Service programs would provide low-level market and high-level nonmarket outputs on National Forest lands, and high-level market and nonmarket outputs on State and private forest and rangelands.)

Under Alternative 4, compared to the 1975 Recommended Program, an effort would be made to shift many renewable resource market outputs from the National Forest System to State and private forest lands. Meanwhile, a greater emphasis would be placed on nonmarket outputs from the National Forest System than under the 1975 Recommended Program.

Program in Brief

National Forests

Within the National Forest System, management would emphasize nonmarket and environmental quality. The volume of timber harvested would be substantially reduced from current levels. Range, water, and mineral resources would be managed and utilized to avoid conflicts with natural beauty, wildlife, fish, and other nonmarket values.

State and Private Forestry

State and Private Forestry programs would emphasize both market and nonmarket objectives. Technical and financial assistance from the Federal Government would be expanded in an effort to increase the volume of timber produced and the efficiency of wood utilization on State and private forest lands. Increased emphasis would also be placed upon cooperative programs that protect and encourage the production of nonmarket outputs from State and private forest lands. Increased financial and technical assistance negative effects in accordance with landowner objectives.

Research

Forestry research would intensify the development of scientific knowledge needed to manage forests and range lands for the simultaneous production of market and nonmarket outputs while protecting land productivity and environmental quality. Cooperative research efforts with universities and other agencies would be continued and accelerated.

Human Resource Development

Human Resource Development programs would emphasize resource protection and restoration within the National Forest System, while providing a work force for the development of both market and nonmarket outputs on State and private forest lands.

Summary of Program Outputs, Activities, and Costs

Under Alternative 4, recreation opportunities on the National Forest System would double by 2025, with the increase spread equally between developed and dispersed activities. Developed use would go from 80 million visitor days in 1978 to 157 million in 2025, and dispersed use would expand from 130 million to 250 million visitor days during the same period. This does not include wilderness use. Cooperative assistance would increase significantly to promote optimum capabilities for high quality outdoor recreation.

Alternative 4 would provide the greatest increase of wilderness of the five Alternatives, the bulk of it being in the Alaska and Intermountain Regions.

Wildlife habitat improvement on the National Forest System would increase from 2.3 million acre-equivalents in 1978 to 3.6 million in 1985. Anadromous fish habitat improvements would increase the annual contribution of the National Forests to the commercial salmon fishery by 3.8 million pounds in 1985 and 25.5 million pounds in 2005 through 2025. Cooperative assistance for wildlife and fish habitat improvement on non-Federal public forest lands would be significantly increased.

Livestock grazing would inevitably decline to accommodate a high level of recreation and wildlife use. Grazing is projected to decrease from the present 9.9 million animal-unit-months to 8.6 million in 2025. Cooperative assistance for forage production and utilization on non-Federal forested ranges would be greatly expanded.

National Grassland management would emphasize use of the Federal land to demonstrate sound and practical principles of land use and to exert a favorable influence for securing sound land conservation practices on associated private lands to help meet both market and nonmarket objectives on the private lands.

Timber sale offerings from the National Forest System would be decreased from 12.2 billion board feet in 1978 to 8.6 billion in 2025 by restricting timber harvests to primarily the highly productive stands throughout the NFS's commercial forest land. This would provide economic incentives for increasing production on State and private forest lands.

On the National Forests, 245,000 acres of reforestation would be done annually by 2025 on all harvested and catastrophically deforested lands that are accessible. Cooperative assistance would be greatly increased--more than under any other Alternative.

Water quantity would remain unchanged, and the percentage of water volume meeting water quality goals would increase slightly. Cooperative assistance for protecting and improving the quality, quantity, and timing of water yields from non-Federal forest lands would increase significantly.

Alternative 4 provides for limited processing of mineral proposals for National Forest System lands, giving priority to energy and to 1872 Mining Law operations. Cooperative assistance to State forestry agencies for mined land reclamation on non-Federal lands would be accelerated.

Research would emphasize the production of knowledge and technology needed to support a shift of market outputs from public to private forest lands. Basic resource protection would be stressed, as well as knowledge and technology needed to minimize conflicts between alternative uses of both public and private forest and rangelands.

A high level and broad range of human resource employment and training programs would be offered on the National Forest System. Environmental awareness and educational programs for the disadvantaged would be emphasized. Cooperative assistance to States and cities for urban and community forestry would increase significantly.

The total Forest Service work force, in thousand person-years, necessary to perform the work included in this Alternative is as follows:

Base Year						1986-	1991-	2001-	2011-	2021-
1978	1981	1982	1983	1984	1985	1990	2000	2010	2020	2030
44.4	68.7	71.9	72.6	74.8	74.7	66.1	63.5	65.0	66.2	66.7

Table 3.13 displays a national summary of National Forest System projected program outputs, activities, costs, and returns to government for Alternative 4. Table 3.14 shows comparable data for State and Private Forestry programs. Table 3.15 summarizes the Research program. Costs by program area for Alternative 4 are shown in figure 3.100.

Table 3.13.--Projected National Forest System program outputs, activities, and costs 1/

Alternative 4

Program element and output/activity	Unit of measure	Base year 1978	Annual units									
			1981	1982	1983	1984	1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
RECREATION												
Developed Recreation Use (Includes VIS)	Million Recreation Visitor Days	79.6	86.4	91.5	96.3	99.7	103.3	114.6	127.3	137.2	146.0	157.4
Dispersed Recreation Use (Includes Wildlife & Fish)	Million Recreation Visitor Days	130.2	142.5	147.4	153.5	160.2	166.2	180.2	197.2	224.2	244.2	250.1
Trail Construction/Reconstruction	Miles	600	3400	2300	2200	2200	2100	2200	2300	2400	2500	2600
WILDERNESS												
Wilderness Management	Million Acres	15.3	37.8	40.6	41.7	43.0	45.3	46.9	47.1	47.3	47.5	47.8
WILDLIFE & FISH												
Wildlife Habitat Improvement	Thousand Acre-Equivalents	2330	2860	2840	3030	3270	3570	2900	2480	2230	1550	1480
Anadromous Fish Improvement	Thousand Pounds	--	3	210	581	1680	3750	9680	19600	25500	25500	25500
RANGE												
Grazing Use (Livestock)	Million Animal-Unit Months	9.9	9.8	9.8	9.7	9.7	9.6	9.5	9.2	8.9	8.8	8.6
TIMBER												
Programmed Sales Offered	Billion Board Feet	12.2	11.3	10.8	10.7	10.6	10.4	9.7	9.6	9.3	8.9	8.6
Reforestation	Thousand Acres	411	423	433	430	424	416	274	265	255	251	245
Timber Stand Improvement	Thousand Acres	420	342	362	337	309	282	265	165	165	165	165
WATER												
Volume Meeting Water Quality Goals	Million Acre Feet	--	401	402	404	405	406	410	418	421	421	421
MINERALS												
Minerals Leases and Permits	Thousand Operating Plans	14.5	16.1	16.9	18.1	19.0	20.0	21.0	22.3	24.0	25.6	27.4
HUMAN & COMMUNITY DEVELOPMENT												
Human Resources Programs 2/	Thousand Enrollee Years	14.8	16.7	21.2	21.2	21.2	21.2	14.1	14.1	14.1	14.1	14.1
PROTECTION												
Fire Management Effectiveness Index	Dollars/Thousand Acres	1110	1140	1220	1230	1230	1220	1210	1220	1250	1240	1230
Fuelbreaks & Fuel Treatment	Thousand Acres	392	248	220	233	237	242	234	211	231	227	227
LANDS												
Land Purchase and Acquisition (Excludes Exchange)	Thousand Acres	117	222	213	218	220	221	376	104	136	168	184
SOILS												
Soil & Water Resource Improvement (Improved Watershed Condition)	Thousand Acres		15.6	17.8	18.9	19.7	19.7	22.7	23.8	22.2	18.1	18.2
FACILITIES												
Road Construction/Reconstruction (Arterial, Collector)	Miles	690	190	470	510	580	590	770	940	770	770	770
RETURNS TO THE GOVERNMENT	Million Dollars		1032	994	1062	1124	1180	1300	1564	1880	2356	2874
COSTS												
NATIONAL FOREST SYSTEM-												
Operational	Million Dollars	676	3/ 878	1014	1048	1090	1110	1240	1312	1355	1428	1487
Capital Investments 4/	Million Dollars	684	779	737	732	766	757	423	498	507	452	390
Backlog 5/	Million Dollars	61	44	48	49	48	38	34	30	--	--	--
Total Appropriated 6/	Million Dollars	1421	1701	1799	1829	1904	1905	1697	1840	1862	1880	1877
Allocated Funds 7/	Million Dollars	244	384	384	385	385	386	269	3	3	3	3
Total NFS	Million Dollars	1665	2085	2183	2214	2289	2291	1966	1843	1865	1883	1880

1/ All costs and returns are shown in constant 1978 dollars.

2/ Human Resource Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

3/ The 1978 base year figure has been adjusted upward in order to include the effect of the revised fire financing policy which calls for full funding of presuppression activities instead of relying on supplemental appropriations. The amount of the adjustment (92.4) is from the 1979 President's Budget.

4/ NFS capital investments are such things as: sale preparation--live volume; TSI/reforestation; range structural improvements; road and trail construction/reconstruction; wildlife and fish habitat improvement; developed recreation site construction; water and soil resource improvements; and fuel treatments.

5/ Backlog costs are shown here for information only and are included in capital investment costs.

6/ Total appropriated costs are the sum of operational and capital investment costs. NFS appropriated funds include all YCC and Cooperator Funds.

7/ NFS allocated costs include YACC and other human resource programs, O&C Grants, Land and Water Conservation, and other funds. Costs exclude payments to States and Counties, and Federal Highway Funds.

Abbreviations used: AUM = animal unit month; RVD = recreation visitor day.

Table 3.14--Projected State & Private Forestry program outputs, activities,
and costs 1/

Alternative 4

Program element and output/activity	Unit of measure	Base year 1978	1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
RECREATION												
Technical Assistance for Dispersed Recreation	Thousand Acres	81	299	313	344	371	395	440	553	587	625	647
WILDLIFE & FISH												
Technical Assistance for Wildlife Habitat Improvement	Thousand Acres	170	856	940	1030	1110	1170	1290	1590	1660	1720	1770
RANGE												
Technical Assistance for Range Improvement	Thousand Acres	50	187	208	243	269	290	337	447	486	528	558
TIMBER												
Reforestation (RFA, FIP, ACP)	Thousand Acres	326	852	949	1030	1120	1230	1250	1310	1450	1580	1690
Timber Stand Improve- ment (RFA, FIP, ACP)	Thousand Acres	275	666	669	720	746	776	866	1077	1257	1408	1539
Timber Prepared for Harvest	Million Cubic Feet (MMCF)	225	341	366	379	393	405	463	564	630	691	739
Woodland Owners Assisted	Thousand Owners	165	249	262	290	298	303	344	365	462	507	543
Improved Wood Utilization	Million Cubic Feet (MMCF)	164	242	246	251	256	260	261	302	317	335	351
HUMAN AND COMMUNITY DEVELOPMENT												
Urban and Community Forestry	Thousand Urban Areas	7.0	3.5	4.7	5.9	6.7	7.5	8.0	9.1	9.4	9.4	9.4
PROTECTION												
Insect and Disease Surveys	Million Acres	600	474	519	566	614	660	672	689	712	717	902
Rural Community Fire Protection	Thousand Approved Applications	3.0	4.3	4.7	5.0	5.4	5.5	5.6	5.8	6.0	6.3	6.6
Fire Loss on Pro- tected Area	Thousand Acres Burned	1700 2/	1450	1410	1400	1380	1340	1290	1190	1070	963	870
WATER, MINERALS, LANDS, AND SOILS												
State Forest Resource Planning	Million Acres	--	201	144	210	178	182	211	218	219	219	224
Landowner Forest Management Plans	Million Acres	3.2	4.3	4.6	4.8	4.9	5.5	5.7	6.2	9.2	11.4	13.5
Cooperative Technical Assistance	Person Years	--	76	79	82	87	93	85	90	104	103	78
COSTS												
STATE AND PRIVATE FORESTRY-												
Operational	Million Dollars	30	55	68	68	68	68	87	84	89	93	97
Capital Investments 3/	Million Dollars	50	91	106	106	106	106	109	123	132	134	138
Total Appropriated 4/	Million Dollars	80	146	174	174	174	174	196	207	221	227	235
Allocated 5/	Million Dollars	37	79	93	93	93	93	82	89	92	99	105
Total S&PF	Million Dollars	117	225	267	267	267	267	278	296	313	326	340

1/ All costs are shown in constant 1978 dollars.

2/ S&PF-Cooperative Fire Loss base figure is calendar year 1977.

3/ S&PF capital investments include such activities as: reforestation; timber stand improvement; preparation of landowner forest management plans; cooperative forest resource planning; insect and disease surveys; and fire management planning and fuel treatment.

4/ Projected estimates of funds appropriated to the Forest Service for cooperative forestry assistance under P.L. 95-313.

5/ Projected estimates of funds appropriated to other USDA agencies for programs which receive assistance from the Forest Service and State forestry agencies, including (1) forestry practices under the Agriculture Conservation Program and the Forestry Incentives Program funded through the Agricultural Stabilization and Conservation Service; (2) Rural community fire protection funded through the Farmers Home Administration; and (3) funds allocated to the Forest Service by the Soil Conservation Service for the forestry aspects of watershed planning, flood prevention, river basin surveys and investigations, and resource conservation and development.

Table 3.15--Planned Research program activities and costs

Alternative 4

FOREST RECREATION RESEARCH	Substantial increases in knowledge to manage and protect wilderness and unique ecological features.
WILDERNESS RESEARCH	Greater knowledge to manage and protect wilderness and unique ecological features.
WILDLIFE, FISH, AND PLANT HABITAT RESEARCH	More scientific knowledge of all game and nongame species, vertebrates and invertebrates and their habitats.
RANGE RESEARCH	Expanded base of knowledge to increase livestock production from forest and rangelands by methods that are energy efficient and environmentally acceptable.
TIMBER MANAGEMENT RESEARCH	Increased knowledge for extensive management. Intensive culture to improve growth on private forest lands.
FOREST PRODUCTS UTILIZATION RESEARCH	Increased knowledge of complete tree use from private lands and improved wood performance.
FOREST ENGINEERING RESEARCH	Increased engineering knowledge to protect NFS lands and harvest hardwoods on State and private lands.
WATER RESOURCE RESEARCH	Moderate increases in knowledge to provide on-site water quality and quantity, eliminate pollutants, maintain aquatic features and ecosystems.
SURFACE ENVIRONMENT AND MINING (SEAM) RESEARCH	Knowledge to maintain mine area water quality, esthetics, recreation, wildlife habitat, range, timber ecosystems and protect valuable sites.
URBAN AND COMMUNITY FORESTRY RESEARCH	Substantial increase in knowledge to maintain, utilize and protect urban forest and integrate urban forest management into urban planning.
FIRE AND ATMOSPHERIC SCIENCES RESEARCH	Substantial increase in knowledge of fire management systems for a high level of nonmarket outputs from NFS, increased knowledge of fire effect.
FOREST INSECT AND DISEASE RESEARCH	Substantial increase in basic and applied research and development of new and improved insect and disease management systems for high-level market resource outputs from State and private lands and high-level nonmarket resources from NFS lands.
RENEWABLE RESOURCES ECONOMIC RESEARCH	Development of improved economic analyses of management alternatives for all outputs from State and private lands and nonmarket NFS outputs.
RENEWABLE RESOURCES EVALUATION RESEARCH	Inventory information to evaluate all resources emphasis on all outputs from State and private lands and nonmarket NFS outputs.
SOIL MANAGEMENT RESEARCH	Substantial increase in knowledge about soil to maintain water quality necessary for multiresource use and maintain other valuable natural features.

	1970	BASE YEAR 1978	AVERAGE ANNUAL COSTS									
			1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
COSTS												
RESEARCH-												
Operational ^{1/}		105.8	3/162.4	172.3	182.2	192.1	202.0	227.1	252.3	275.2	293.9	312.0
Capital Investments ^{2/}		2.7	32.9	25.7	18.5	11.2	4.0	2.6	2.5	3.0	4.6	6.4
Total Research		108.5	195.3	198.0	200.7	203.3	206.0	229.7	254.8	278.2	298.5	318.4

^{1/} Research program costs only. YCC, YACC, and other Human Resource Programs are included with NFS.

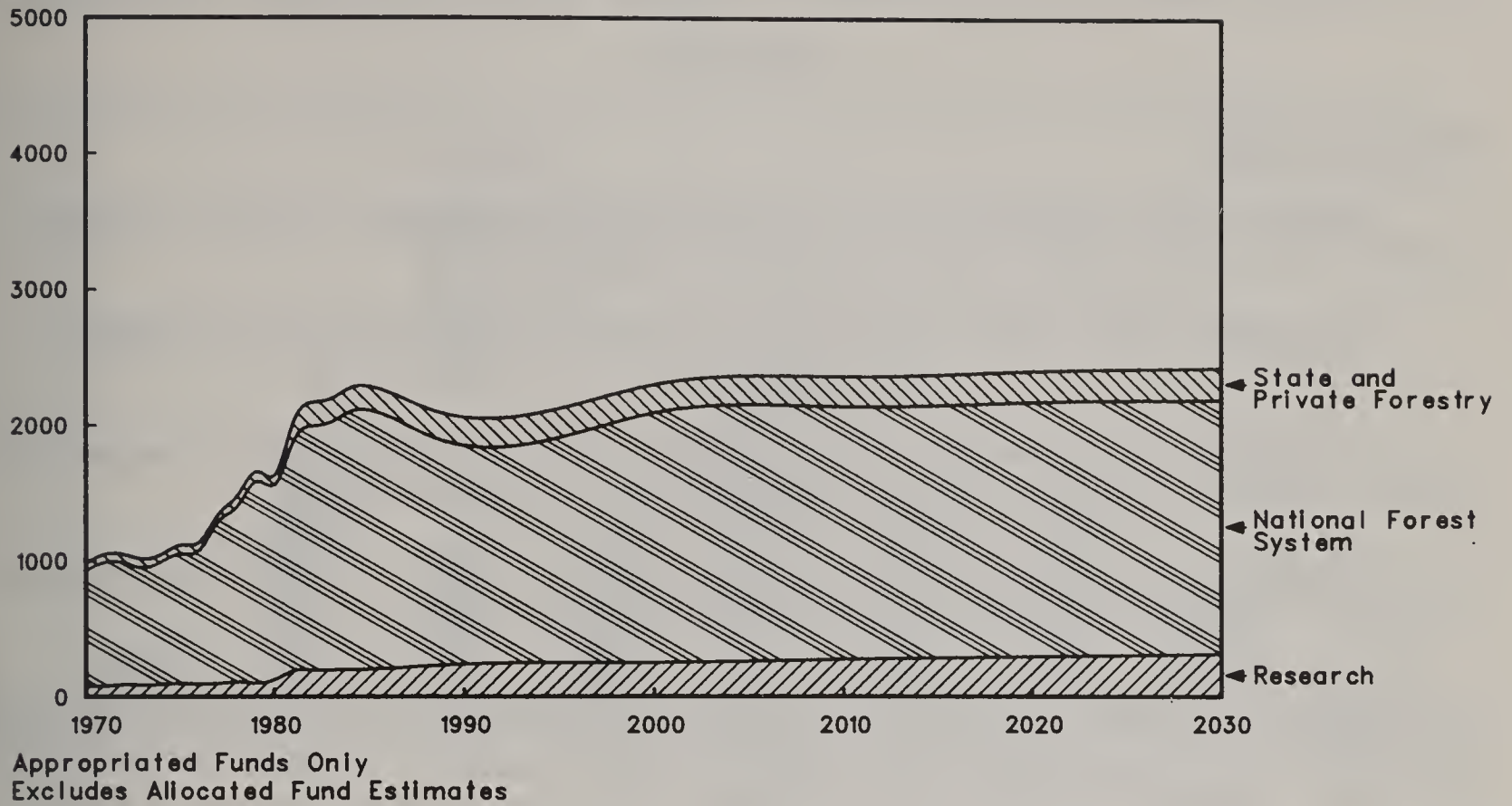
^{2/} Research construction.

^{3/} All costs are in 1978 dollars.

Figure 3.100

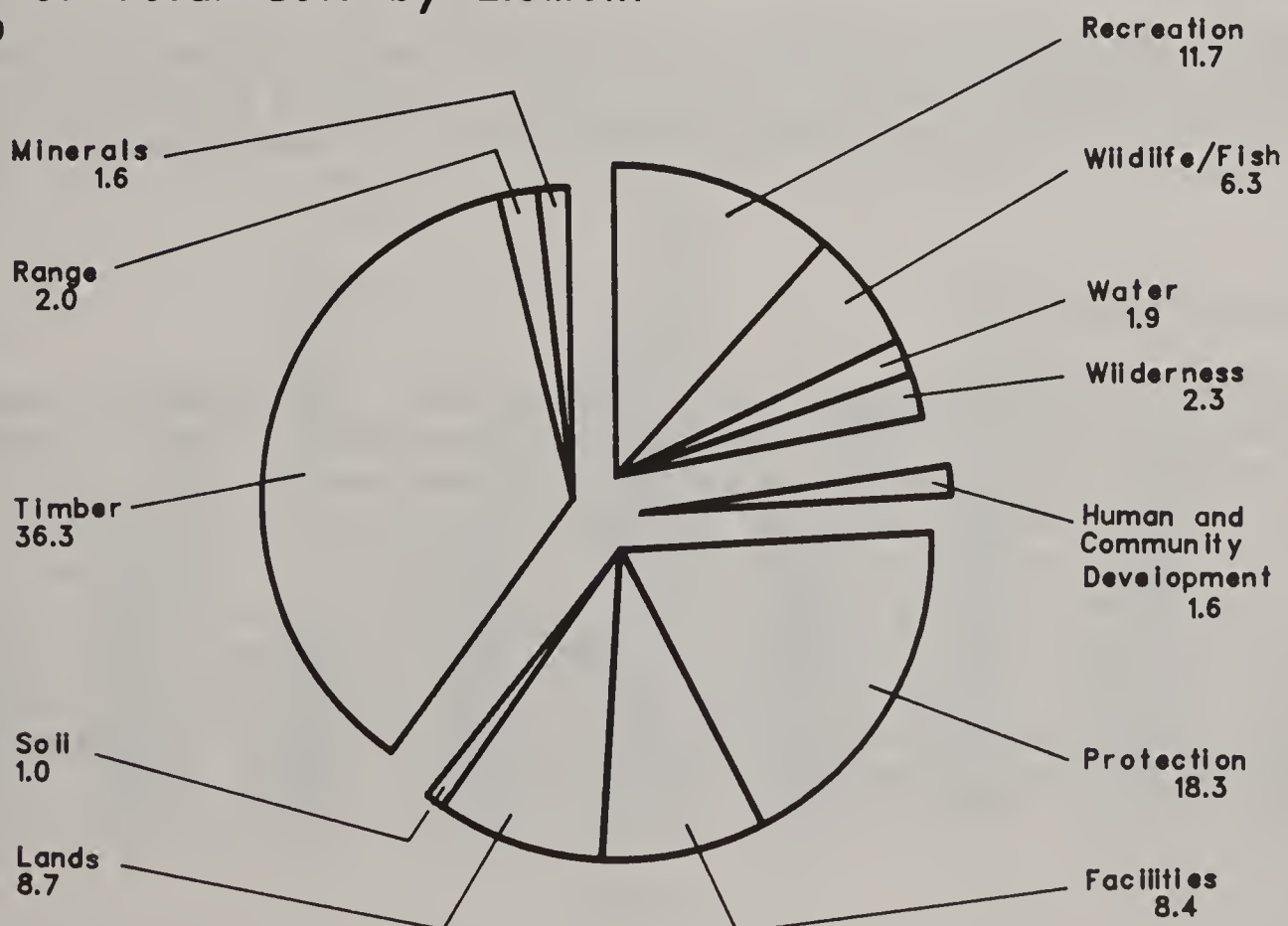
Program Cost-Alternative 4

Million Dollars



Alternative 4

Percent of Total Cost by Element 1991 - 2000



THE DETAILS

This section contains additional narrative and graphic material on goals, outputs, and activities for each element in Alternative 4. The last part of the section summarizes environmental effects of the Alternative.

Recreation

National Goals

General, NFS.--Provide for a significantly increased relative national share of use and outdoor recreation opportunities.

Developed sites, NFS.--Develop and maintain facilities that support Videotype Busy

Dispersed recreation use, NFS.--Provide for significantly increased dispersed outdoor recreation use outside designated wilderness.

Private investments, NFS.--Encourage other Federal, State, and private landowners to develop sites on adjacent non-NFS lands.

Visitor Interpretive Service (VIS), visual and cultural resource management, NFS.--Provide interpretive service at existing visitor centers and other use areas to contact majority of users. Significantly increase orientation services. Analyze, manage, and promote visual and cultural resource values.

Cooperation with others, S&PF.--Promote cooperative planning and technical assistance that emphasize nonincome-producing outdoor recreation on other public and private lands. Private owners desiring technical assistance for income producing projects would be referred to the Soil Conservation Service or to consultants.

Forest recreation research.--Conduct substantial efforts to increase development and use of scientific knowledge to improve methods for managing visitor use and to better understand the social values of outdoor recreation use.

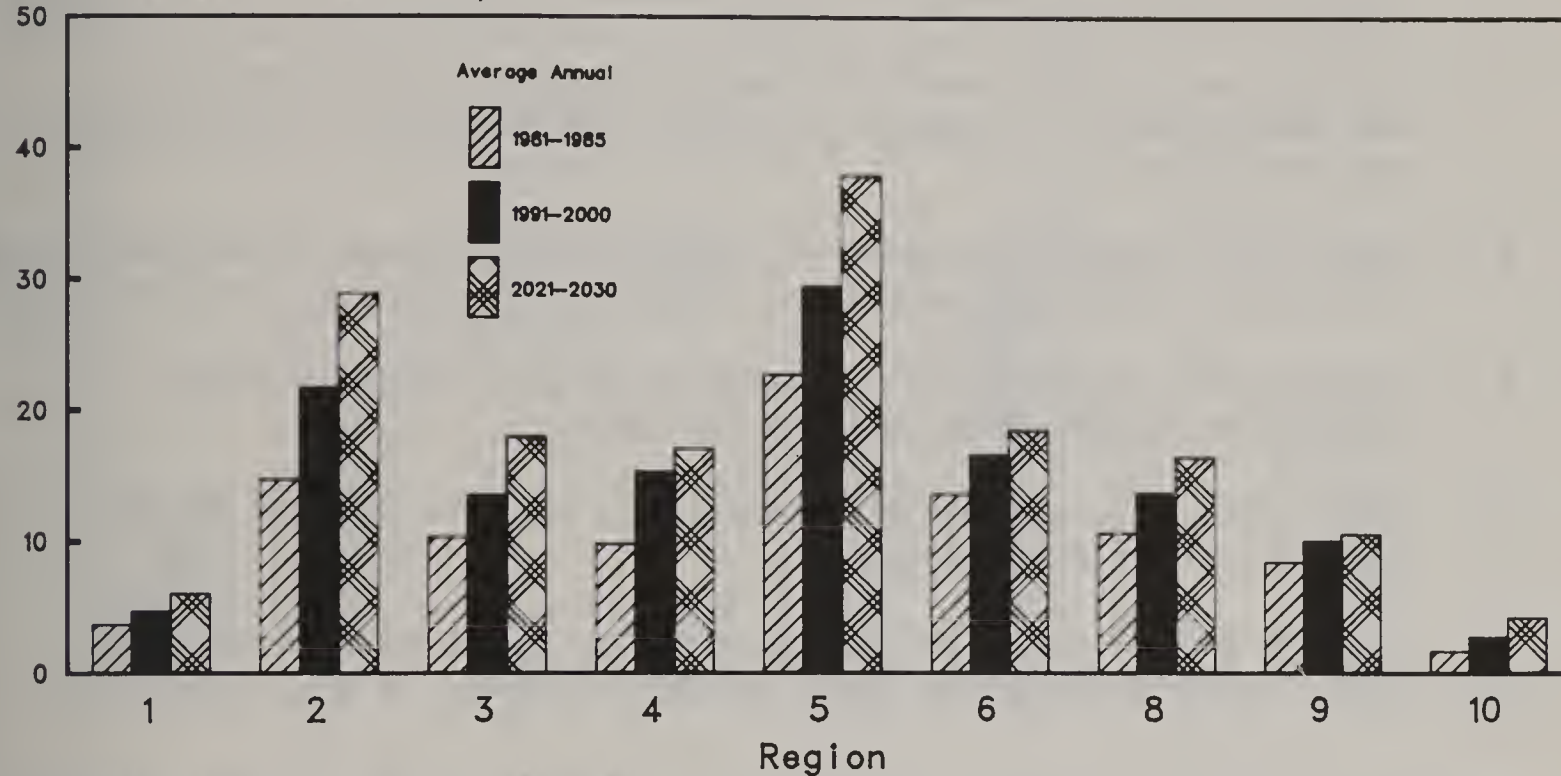
Outputs and Activities

National Forest System.--Under Alternative 4, recreational opportunities on the National Forests would double by the year 2025. This increase in opportunities would be equally spread between developed site and dispersed activities with developed site use increasing from 80 million visitor days in 1978 to 157 million visitor days in 2025 (table 3.13). Dispersed use (excluding wilderness) would increase from 130 million visitor days in 1978 to 250 million visitor days in 2025. As depicted in figures 3.101 and 3.102, this increase would be spread among all Forest Service Regions at about the same rate. Cultural resource protection, interpretation and enhancement would be increased to meet increased visitor use.

Figure 3.101

Regional Estimates-Alternative 4 Developed Recreation Use (NFS)

Million Recreation Visitor Days

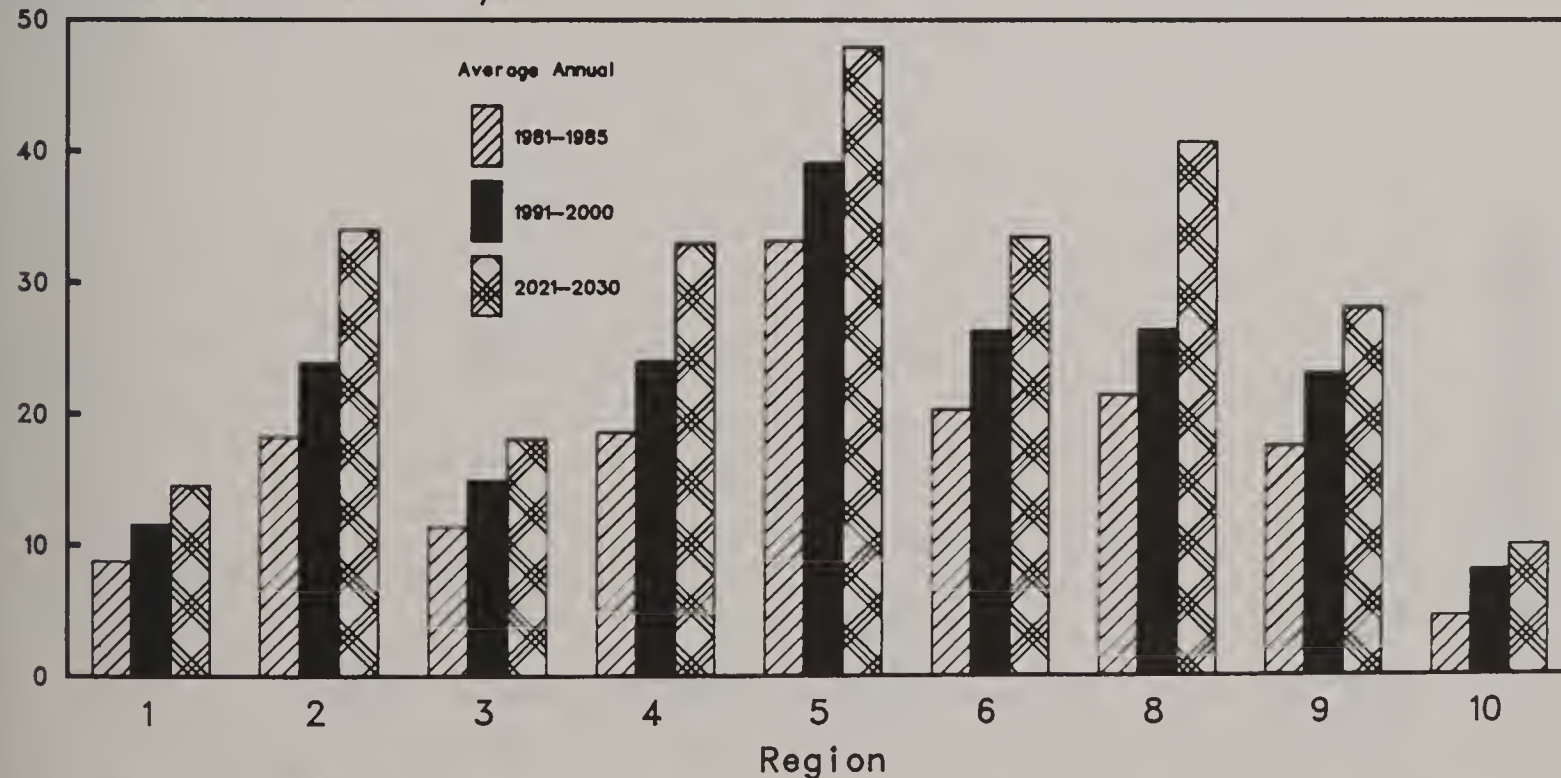


Includes Visitor Information Services

Figure 3.102

Regional Estimates-Alternative 4 Dispersed Recreation Use (NFS)

Million Recreation Visitor Days



Excludes Wilderness Use

Highlights of this Alternative are:

- Optimize dispersed recreational opportunities outside designated wilderness at a rate above the national trend.
- Provide a high level of trail construction-reconstruction and maintenance (figure 3.103).
- Complete facility rehabilitation needs by 1985.
- Provide for a high level of road construction-reconstruction and maintenance to support dispersed and nonmarket recreational opportunities.
- Additional market recreational opportunities, such as alpine skiing and those related to commercial enterprise, would not be encouraged.
- Direct private sector development of commercially oriented recreation developments to private lands.
- Carry out cultural resource compliance work to conform to the level of other activities.
- Provide a full range of interpretive services at interpretive sites, and at dispersed areas as practicable.

State and Private Forestry.--Planning and technical assistance for private and non-Federal public forest lands would be significantly increased to promote optimum capabilities for high quality outdoor recreation (figure 3.104). Recreation and esthetics would be emphasized in multiresource forest management plans, and forest landowners would be advised of the various benefits available through recreation-oriented management.

Research.--New knowledge would be produced to improve user safety, reduce vandalism and user conflicts, improve public involvement, and develop improved techniques for cultural resource inventory.

Figure 3.103

Regional Estimates-Alternative 4 Trail Construction-Reconstruction (NFS)

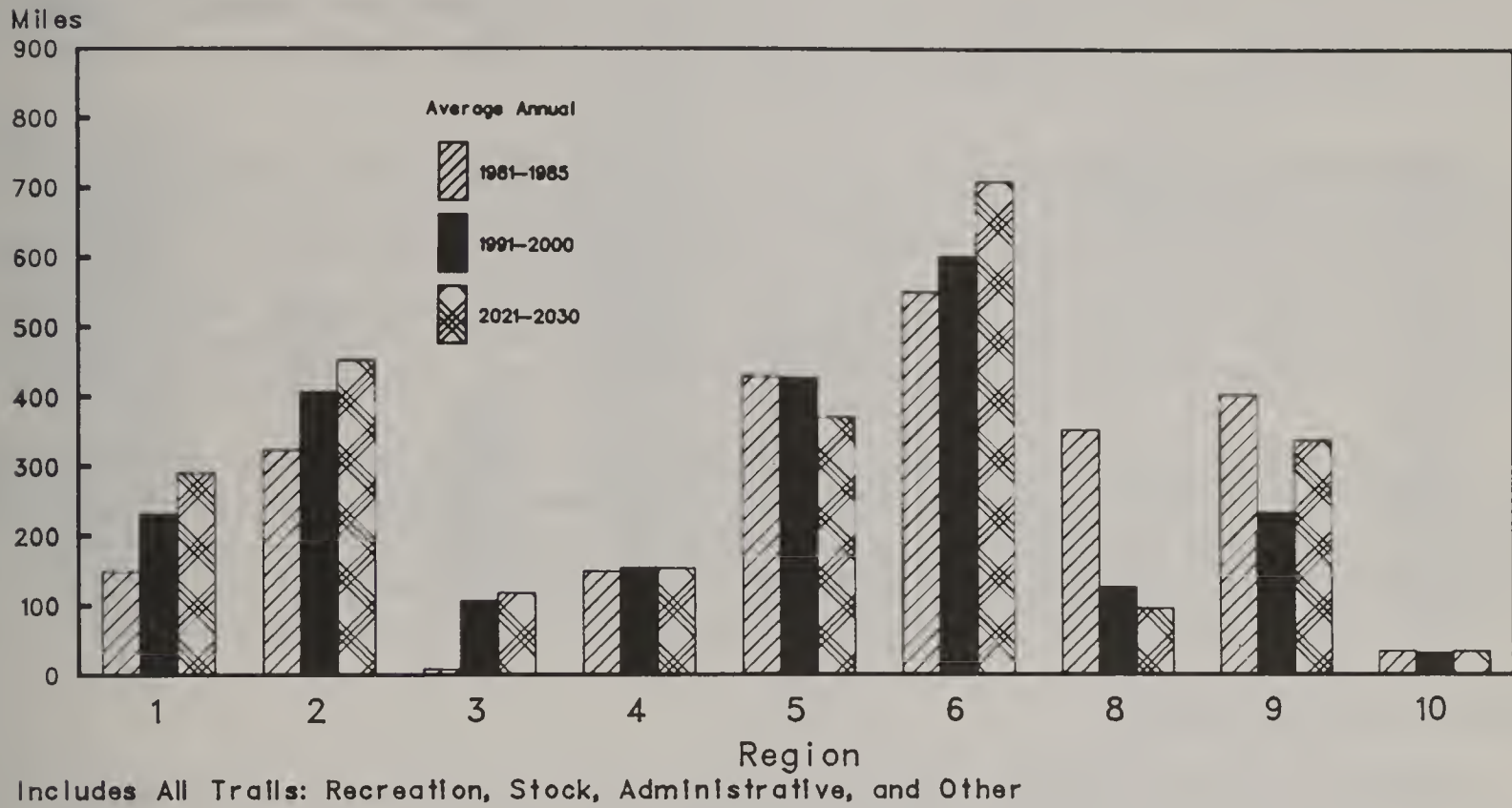
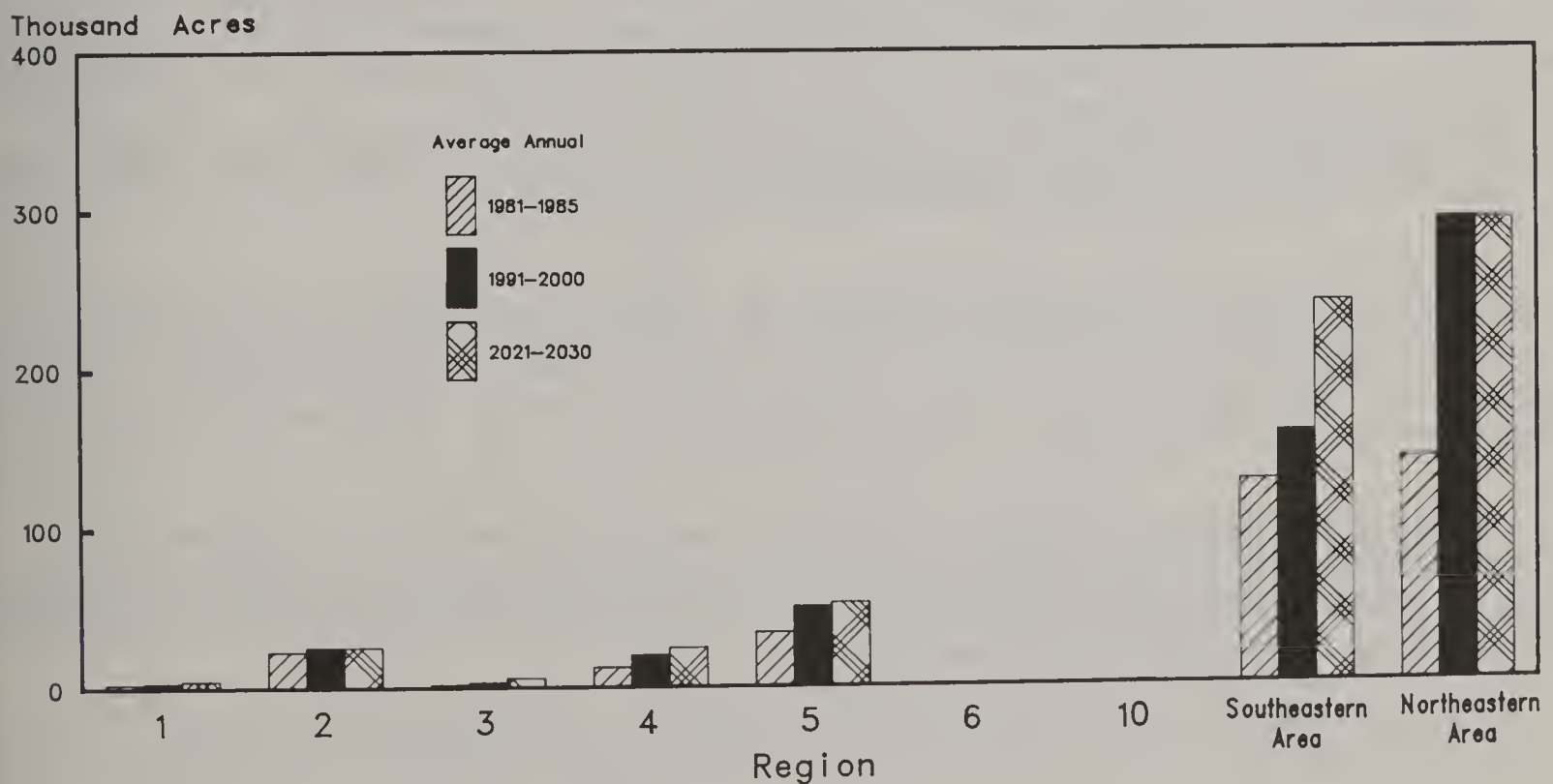


Figure 3.104

Regional Estimates-Alternative 4 Technical Assistance for Dispersed Recreation (S&PF)



National Goals

Wilderness designation, NFS.--Recommend a substantial increase in wilderness beyond the 1975 Recommended Program. In areas where there is a conflict with potential nonwilderness needs, give preference to nonmarket values. Recommend new wildernesses that contain not only very high values for primitive recreation and solitude, but a wide range of values for natural integrity, naturalness, and ecological, geological, or other features of scientific, educational, or historical value.

Wilderness management, NFS.--Provide for a substantial increase in wilderness use, protection of wilderness values, reduction of conflict, and a greater opportunity for experiences in less utilized wildernesses. Maintain very high value conditions for primitive recreation and solitude and a wide range of conditions for natural integrity, naturalness; and ecological, geological, or other features of scientific, educational, or historical value.

Wilderness research.--Conduct substantial effort to increase development and use of scientific knowledge regarding management and protection of natural integrity; apparent naturalness, and ecological, geological, and other features of scientific, educational, scenic, or historical value.

Outputs and Activities

National Forest System.--Approximately 32 million acres (middle of range), as indicated in the projected national outputs in table 3.13 would provide the greatest increase of wilderness of the five Alternatives. Alternative 4 represents the greatest representation of landform, ecosystem, wilderness associated wildlife, and accessibility-distribution characteristics for the Wilderness System. As shown in figure 3.105, the major acreage additions would occur by 1985. The Alaska and the Intermountain Regions provide the bulk of this area.

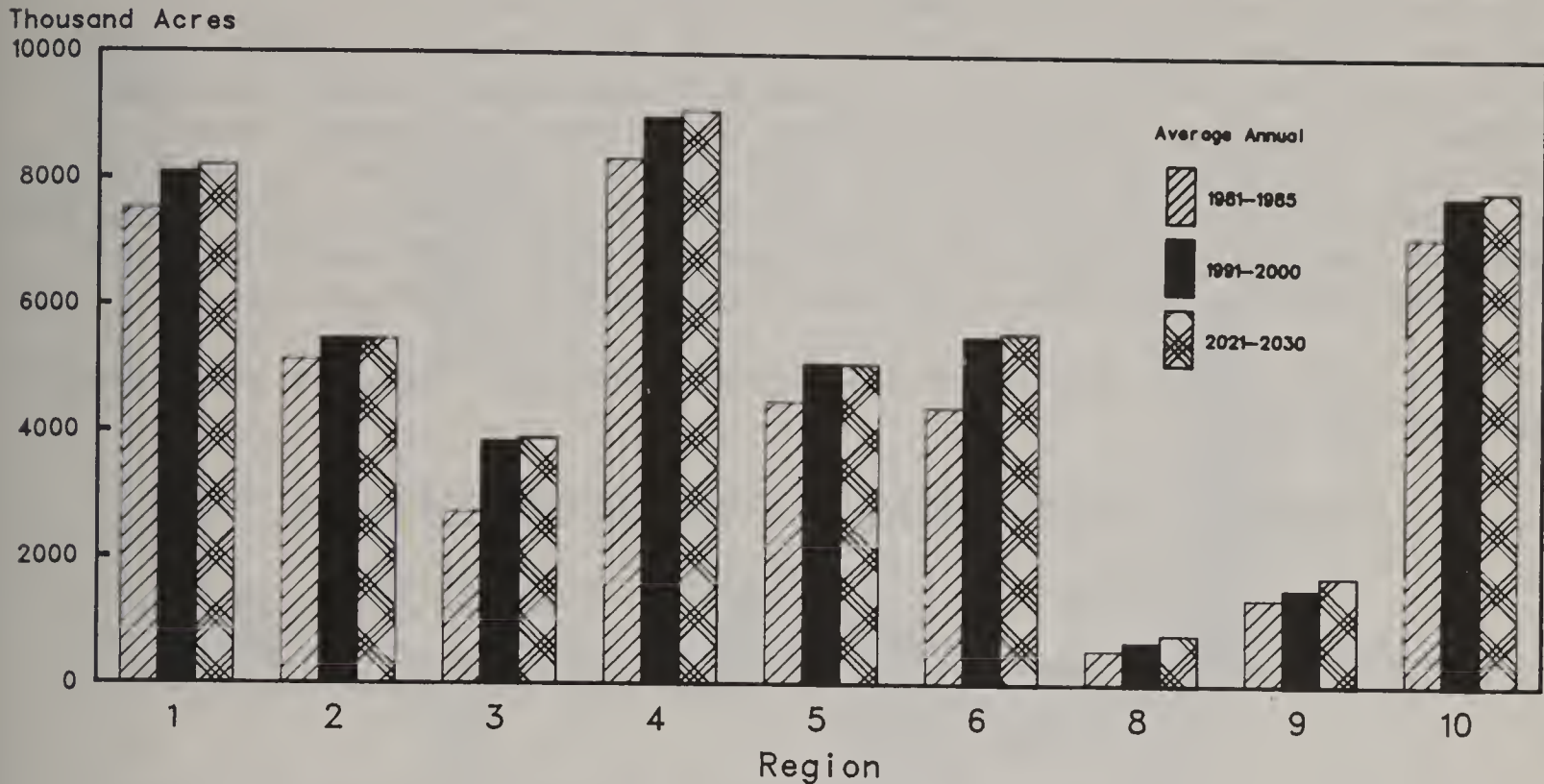
Under Alternative 4, a substantial increase in wilderness use, as related to a substantial increased acreage added to the Wilderness System, would be realized. In addition, more intensive efforts would be made in the management of designated areas to provide for the use of wilderness values, collection of data for further planning, employment of wilderness rangers, and provision of public information about wilderness and its use.

Wilderness research results could be applied to a greater variety of projects involving an increased number of designated areas. A substantial increase in research efforts would greatly assist the wilderness manager in meeting his objectives to provide for public use while perpetuating wilderness values.

Research.--Research would determine how to ensure that long-term ecological processes remain intact, identify endangered and threatened species, measure the significance of geological processes, and preserve scenic quality and historic and prehistoric resources.

Figure 3.105

Regional Estimates-Alternative 4 Wilderness Management (NFS)



Wildlife and Fish

National Goals

Endangered and threatened species, NFS.--Intensively manage habitat for species (plant and animal) on Federal and State lists to protect and maintain populations, and to enhance in conformance with recovery plans.

Habitat diversity, NFS.--Provide a high level of habitat diversity, well distributed, for all indigenous vertebrate and selected invertebrate wildlife species on management units not to exceed 10,000 acres.

Enjoyment of wildlife and fish in developed areas, NFS.--Develop all opportunities for the appreciative (nonconsumptive) enjoyment of wildlife and fish at developed and VIS sites.

Fish habitat improvement, NFS.--Manage anadromous and resident fish habitat at 100 percent of potential.

Population levels, NFS.--Provide habitat for high population levels of all species that are economically or socially important.

Cooperation with others, S&PF.--Provide a high level of technical assistance for increased wildlife and fish production on forested lands.

Wildlife, fish, and plant habitat research.--Develop and use more scientific knowledge and methods to apply new information about game and non-total array of wild fauna, vertebrates, and invertebrates including forests, rangelands and associated waters.

Outputs and Activities

National Forest System.--Wildlife habitat improvements would increase from 2.3 million acre equivalents in 1978 to 3.6 million in 1985. Thereafter, maintenance would largely offset the need for new improvements, except for replacement, and the acre-equivalents would decline to 1.5 million in 2025. Anadromous fish habitat improvements would increase the annual contribution of the National Forests to the commercial salmon fishery by 3.8 million pounds in 1985 and 25.5 million pounds in 2005 through 2025 (figure 3.107). Maintenance of both wildlife and fish habitat improvements would increase throughout the period. Species requiring dead trees, old-growth trees, and dense riparian vegetation would be at high levels. Those species requiring other successional stages would be at moderate to high levels. The high level program in the Southern Region as displayed by figure 3.106 would be due to habitat improvement resulting from prescribed burning opportunities.

It is anticipated that certain management indicator species would respond by 1995 as follows:

Management Indicator Species Index (Current Situation = 100)

<u>Species</u>	<u>Alternative 4</u>
Mule deer	125
White-tailed deer	125
Black-tailed deer	130
Elk	120
Wild turkey	160
Cavity nesting birds	100
Resident trout	135
Anadromous fish	135

Alternative 4 provides the highest output of wildlife and fish, and optimizes these in concert with low market outputs (timber, livestock grazing, minerals) and high outputs in other nonmarket resources (recreation, wilderness). It is fully responsive to public comments calling for increased emphasis on wildlife.

State and Private Forestry.--Technical and related assistance for wildlife and fish habitat improvements would be significantly increased on private and non-Federal public forest lands. This aspect of the Rural Forestry Assistance Program would be particularly intensive in the Northeast (figure 3.108) where landowner interest is high and potentials for increased production of both game and nongame species on private lands are great. State forestry agencies in cooperation with State fish and wildlife agencies, would provide biologists for onsite specialist assistance, and to train foresters to recognize and help to implement wildlife opportunities.

Research.--Research would produce data to improve the information retrieval capabilities needed to maintain a current and comprehensive data source on conditions and requirements of wildlife and fish resources. Included would be new information on game and nongame species and development of innovative methods for transferring this information to user groups, cooperators, and/or decisionmakers. A better understanding of the role that wildlife and fish play in the total fauna-plant relationship, and how they respond to various land management activities, would result.

Figure 3.106

Regional Estimates-Alternative 4 Wildlife Habitat Improvement (NFS)

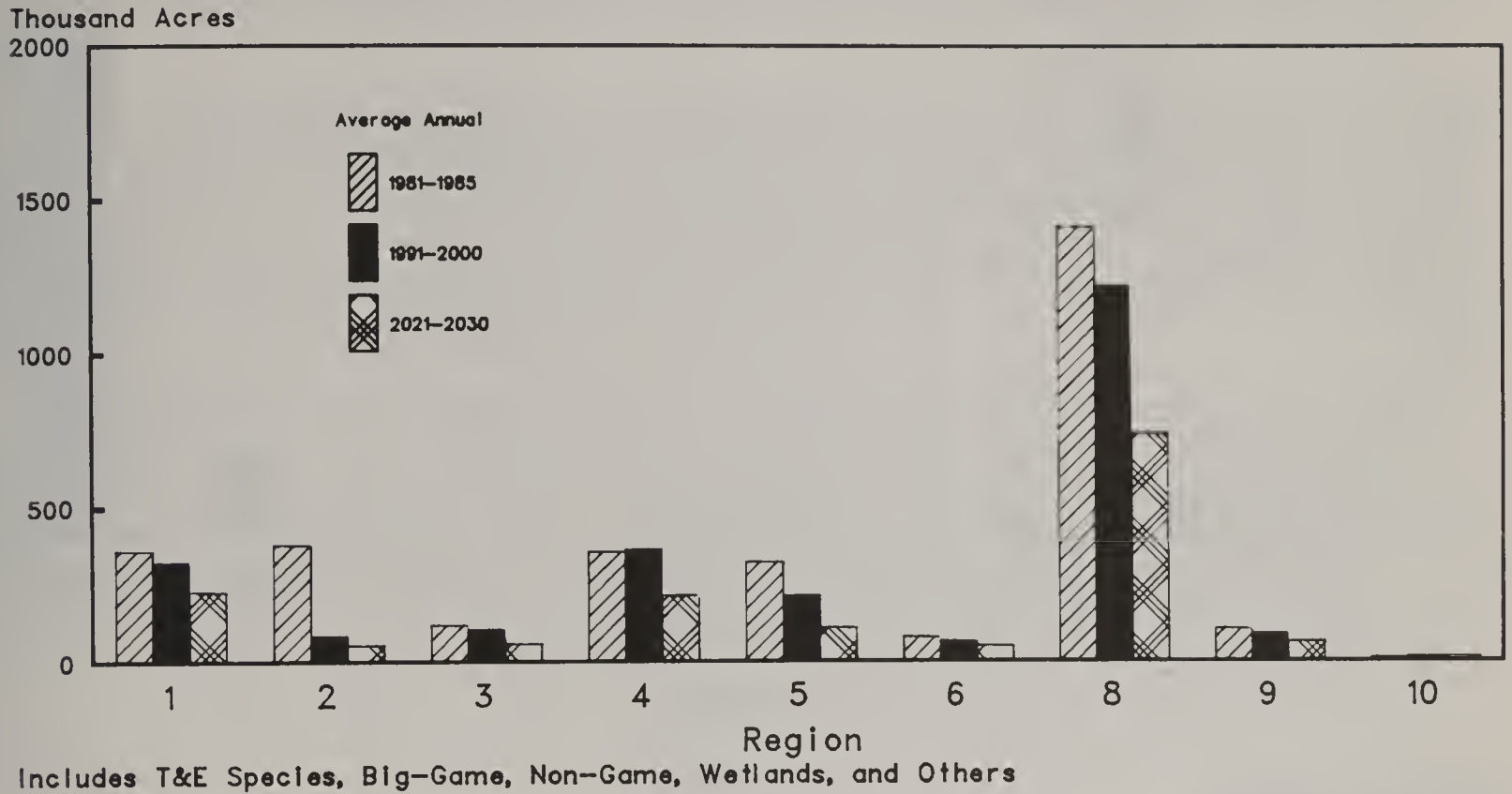
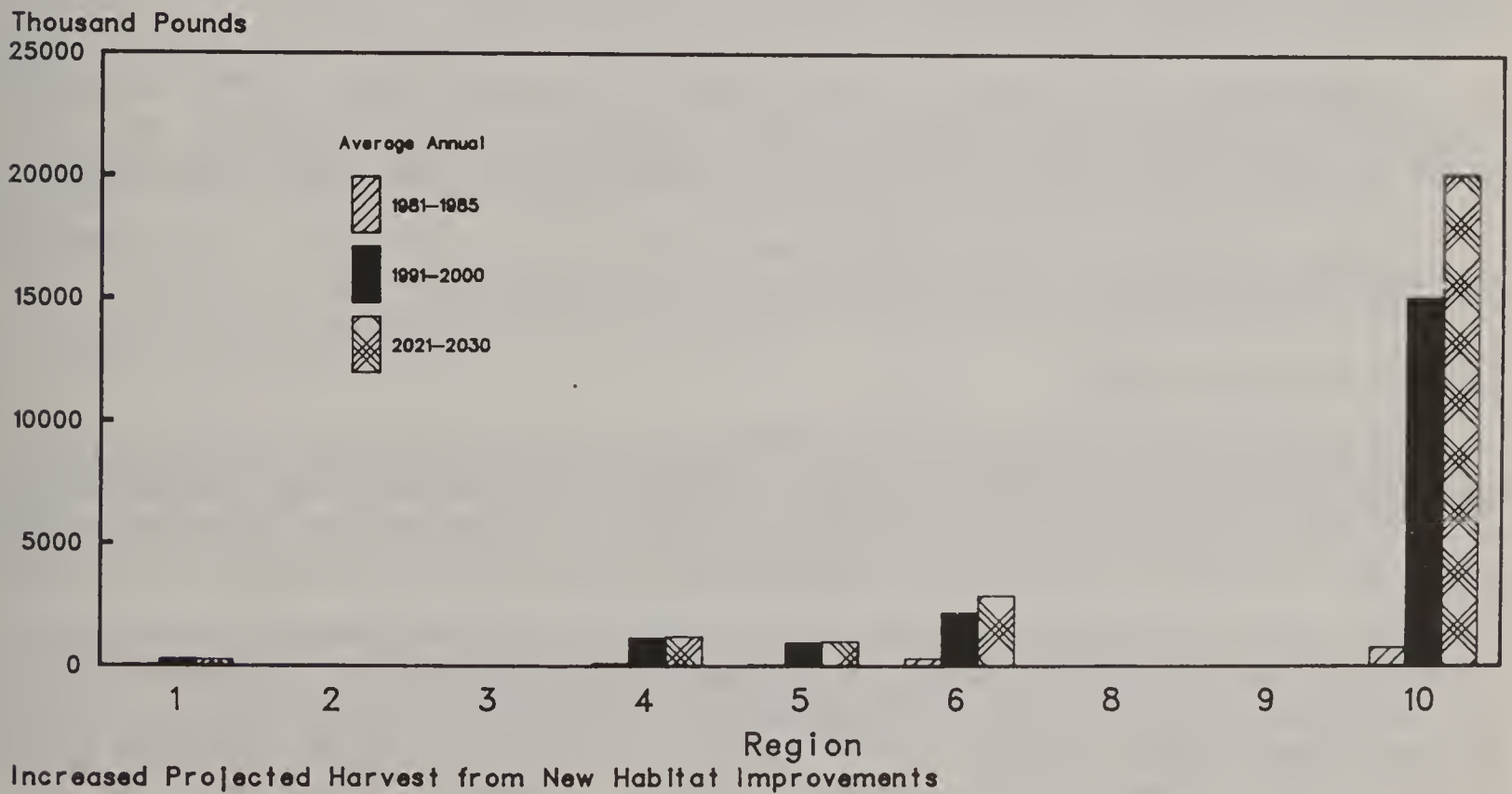


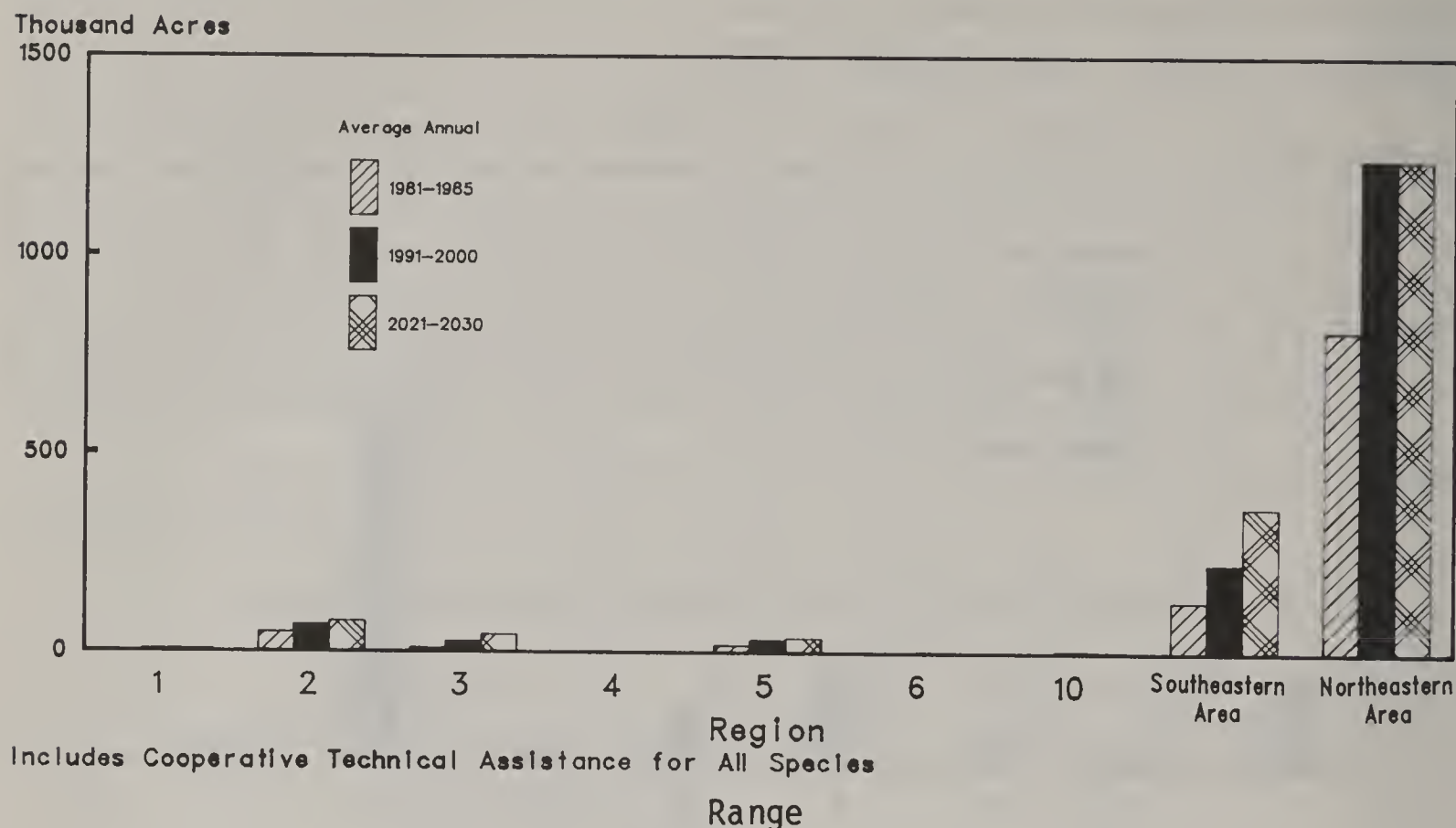
Figure 3.107

Regional Estimates-Alternative 4 Anadromous Fish (NFS)



Regional Estimates-Alternative 4

Technical Assistance for Wildlife Habitat Improvement (S&PF)



National Goals

Range management, NFS.--Provide forage for livestock grazing within the sustained natural capacity of the range and within constrained investments by reducing the number of permitted livestock, phase out least cost-effective management systems, and reduce level of livestock grazing in riparian zones and other important wildlife and recreation areas where compatible livestock management systems cannot efficiently be devised. Manage for native forage species. Restrict improvements and treatments to those rangelands in unsatisfactory condition upon which grazing will continue.

Cooperation with others on non-Federal forested ranges, S&PF.--Expand technical assistance to increase forage production and utilization by livestock on non-Federal forested ranges in cooperation with other agencies.

Range research.--Expand development and use of scientific knowledge to increase production on all range ecosystems emphasizing non-NFS lands.

Outputs and Activities

National Forest System.--Under Alternative 4, livestock grazing would decline, based upon adjustments made necessary to accommodate a high level of recreation and wildlife outputs. Grazing is predicted to decrease from the present 9.9 million animal unit months to 8.6 million animal unit months in 2025. It is anticipated that the 103 million acres presently grazed would be reduced to 95 million acres by the year 2025. Rangeland condition would be expected to improve only slightly under Alternative 4. Financial returns to government would decline. Unit costs of operation and maintenance would be expected to remain approximately constant. However, there would be some

additional costs related to adjustment in livestock numbers. Range betterment funds authorized by the Federal Land Policy and Management Act of 1976 would be utilized for livestock grazing opportunities which do not conflict with other resource uses. The three present evaluation and testing programs underway would be completed. Adjustments in these programs would have to be made to reconcile conflicts in use. Essentially no regional shifts in grazing use in the National Forest system would be anticipated under Alternative 4. Most areas presently grazed probably would continue to be grazed (figure 3.109).

State and Private Forestry.--In cooperation with other responsible agencies, technical and related assistance for forage production and utilization on non-Federal forested ranges would be greatly expanded (figure 3.110). Landowners would be informed of opportunities to include forage production in multiresource forest management plans when it would be compatible with other forest resource uses and landowner objectives.

Research.--New technology would improve the management and utilization of rangeland resources, particularly on public lands not in the National Forest System and private lands. Research would determine how these lands could be better managed for forage and livestock production, recreation, watershed, and other resource values. Multiple-use management would be facilitated by this new technology. Management alternatives would be developed to reclaim deteriorated ranges.

Timber

National Goals

Timber supply, NFS.--Provide timber supply at less than current levels.

Silvicultural practices, NFS.--Concentrate silvicultural practices on land only for nonmarket resource values.

Wood utilization, NFS.--Coordinate removal of wood fiber from harvested areas to enhance natural values and encourage optimum use for all products, including chemical and energy conversion.

Cooperation in private forest management, S&PF.--Stimulate significant expansion of private timber supply and application of improved management practices.

Cooperation in wood utilization, S&PF.--Stimulate significant improvements in use of wood fiber.

Timber management research.--Accelerate applied research of extensive management techniques of major forest types for multiresource values and redirect research on intensive culture, including tree improvement, to improve growth potential of private forest lands.

Forest products utilization research.--Find ways to extend timber supplies and conserve forest resources through more economical utilization of the complete tree, utilization of small and low-grade eastern hardwoods, particularly on private lands.

Figure 3.109

Regional Estimates-Alternative 4 **Grazing Use (NFS)**

Thousand Animal Unit Months

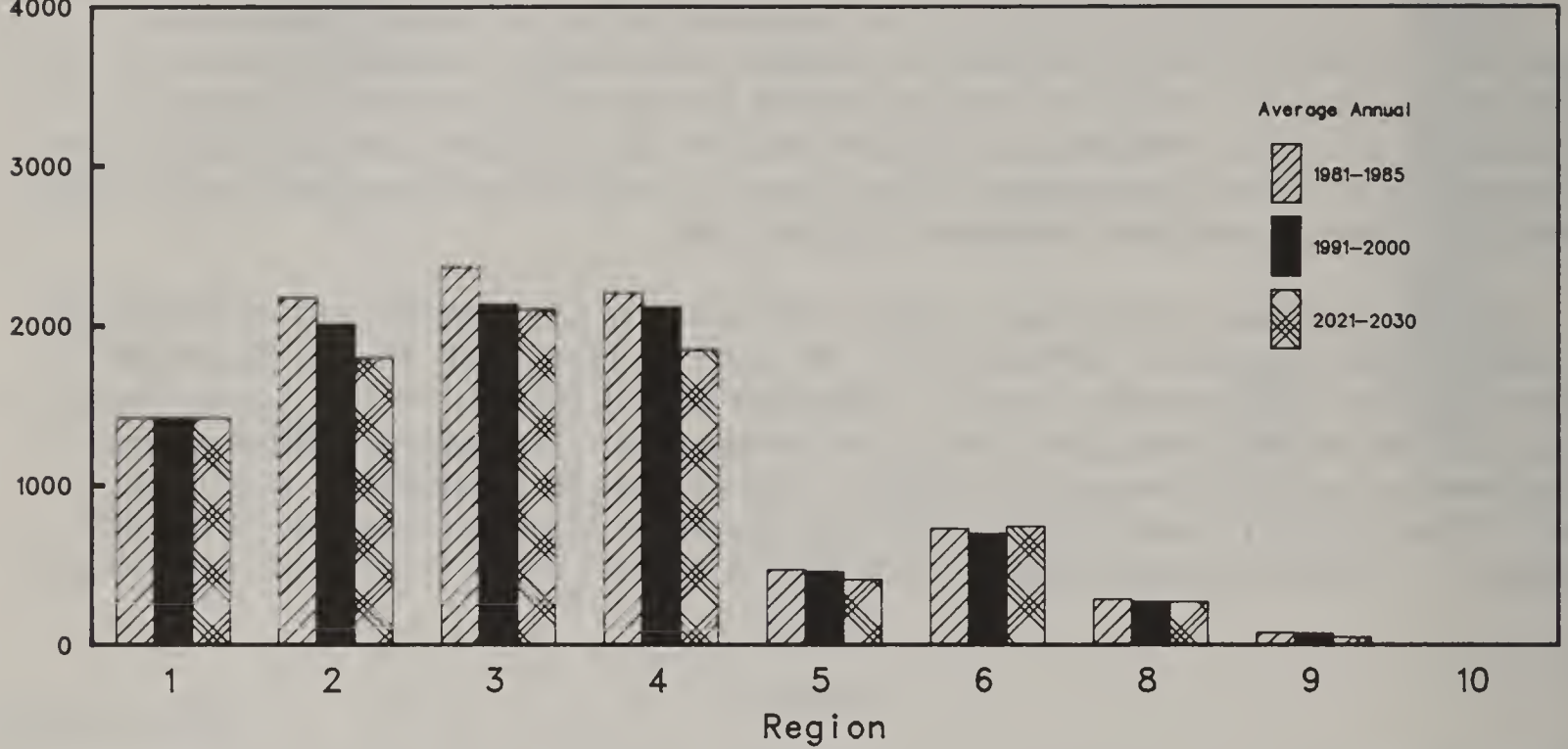
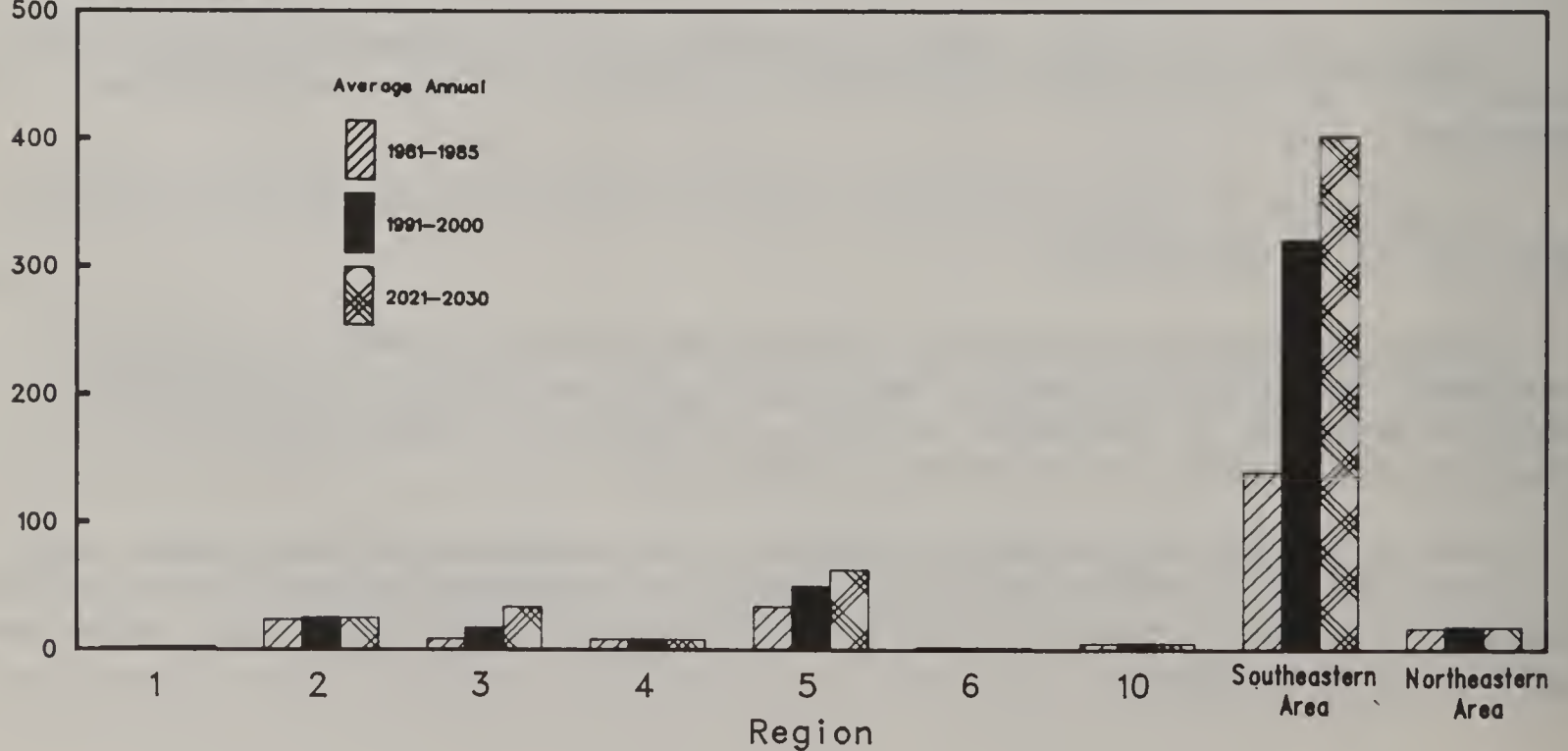


Figure 3.110

Regional Estimates-Alternative 4 **Technical Assistance for Range Improvement (S&PF)**

Thousand Acres



Forest engineering research.--Develop efficient methods to protect and maintain NFS land and encourage the potential production and harvest of State and private lands (especially hardwoods).

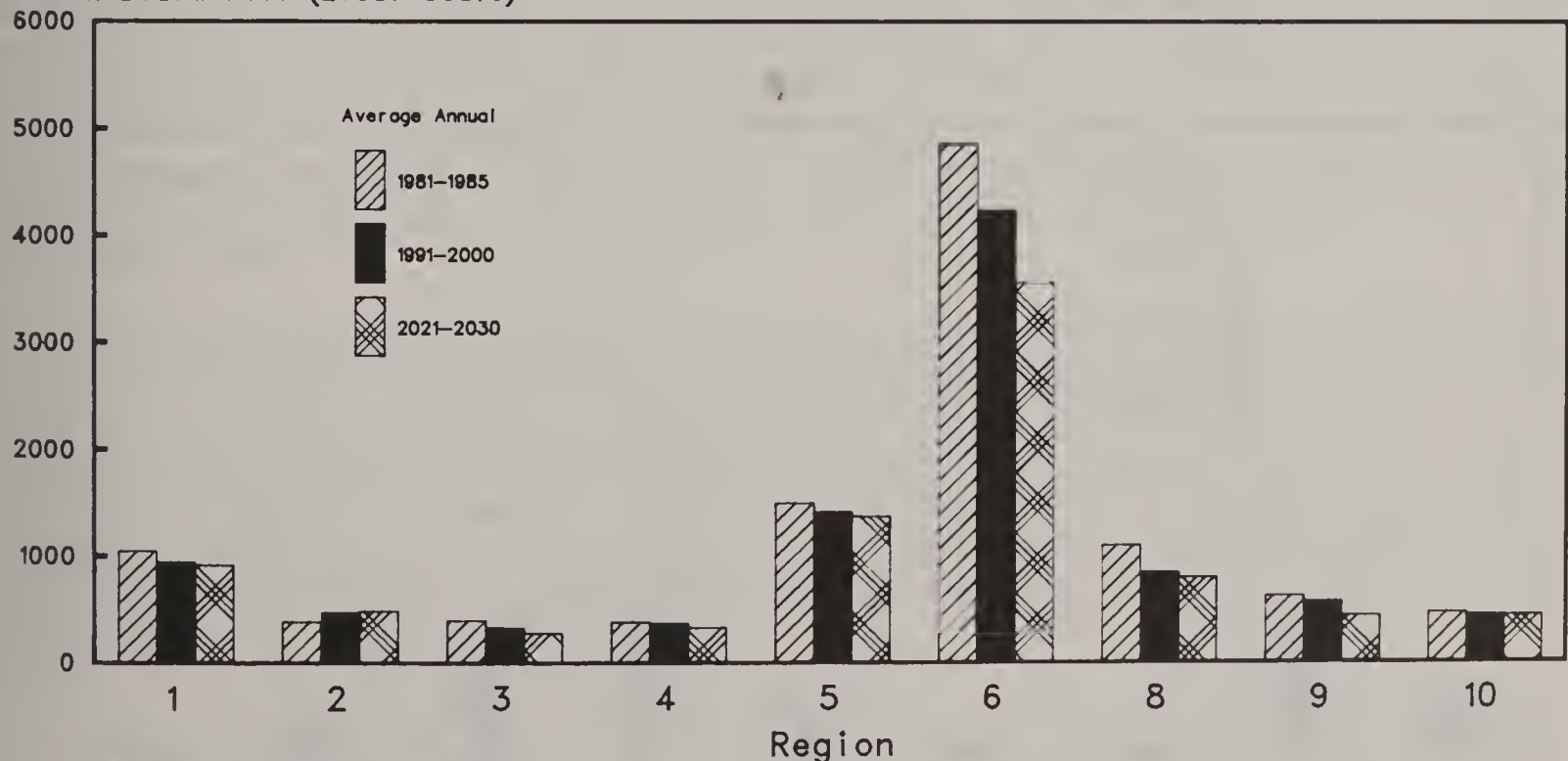
Outputs and Activities

National Forest System.--Timber sale offerings would decrease from 12.2 billion bd. ft. local scale in 1978 to 8.6 billion bd. ft. in 2025 by restricting timber harvests primarily to highly productive stands (figure 3.111). A vigorous program for harvesting dead timber would be maintained. Control of stocking and age class structure would be limited to highly productive timber stands. Reforestation of 245,000 acres annually at 2025 would be done on all regeneration-harvested lands and catastrophically deforested lands that are currently accessible, while forest cover appropriate for other management objectives would be maintained on remaining lands (figure 3.112). Stand tending would be restricted to highly productive accessible stands (figure 3.113). Genetic improvement and fertilization practices would be phased out. The removal of wood fiber from harvested areas would be coordinated to enhance natural values while encouraging optimum use of all products. A total of 418,000 acres of reforestation backlog would be regenerated, resulting in a timber supply of less than current levels.

Figure 3.111

Regional Estimates-Alternative 4 Programmed Sales Offered (NFS)

Million Board Feet (Local Scale)



Includes Live and Mortality; Hardwood and Softwood

Figure 3.112

Regional Estimates-Alternative 4 Reforestation (NFS)

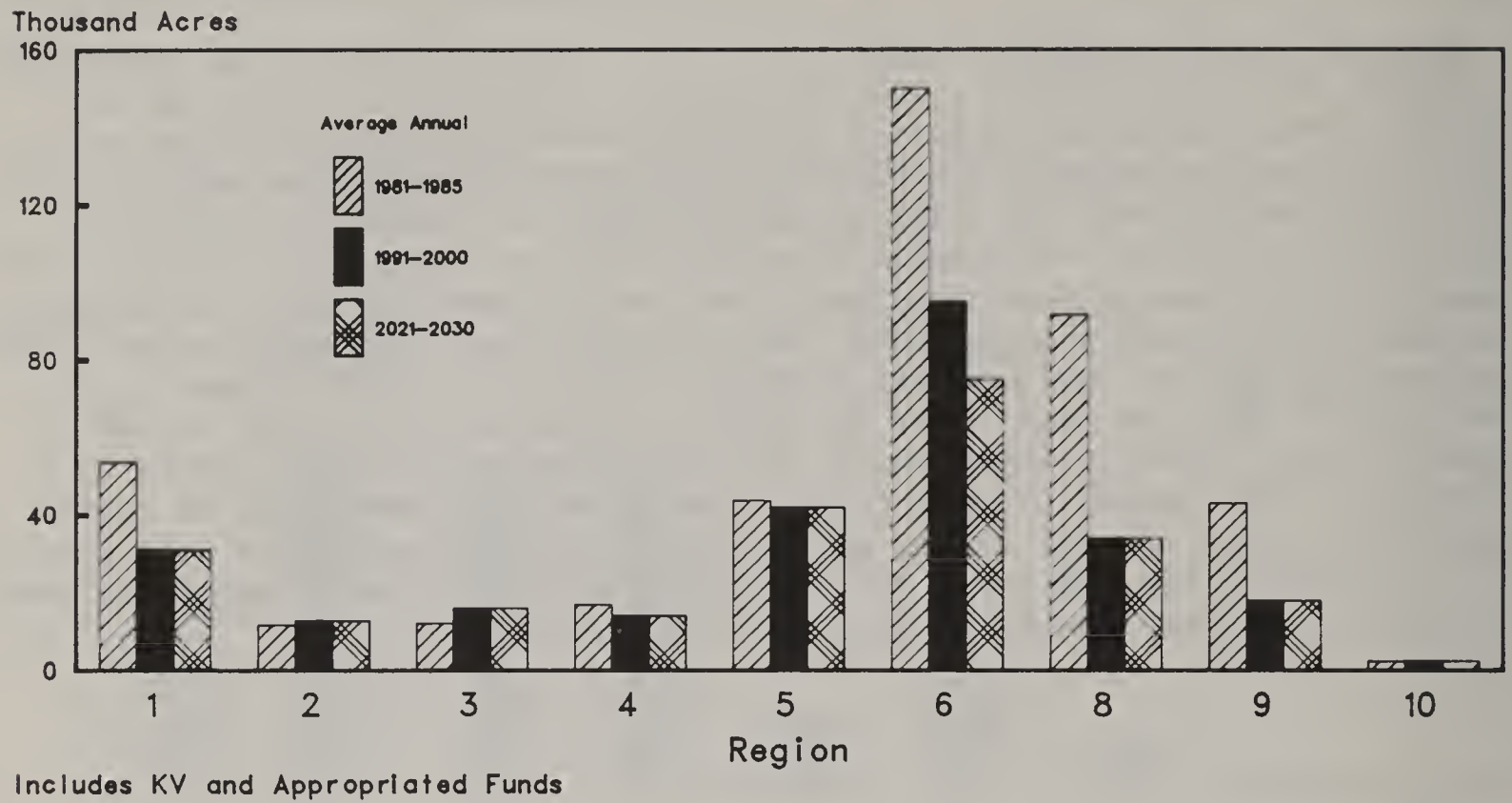
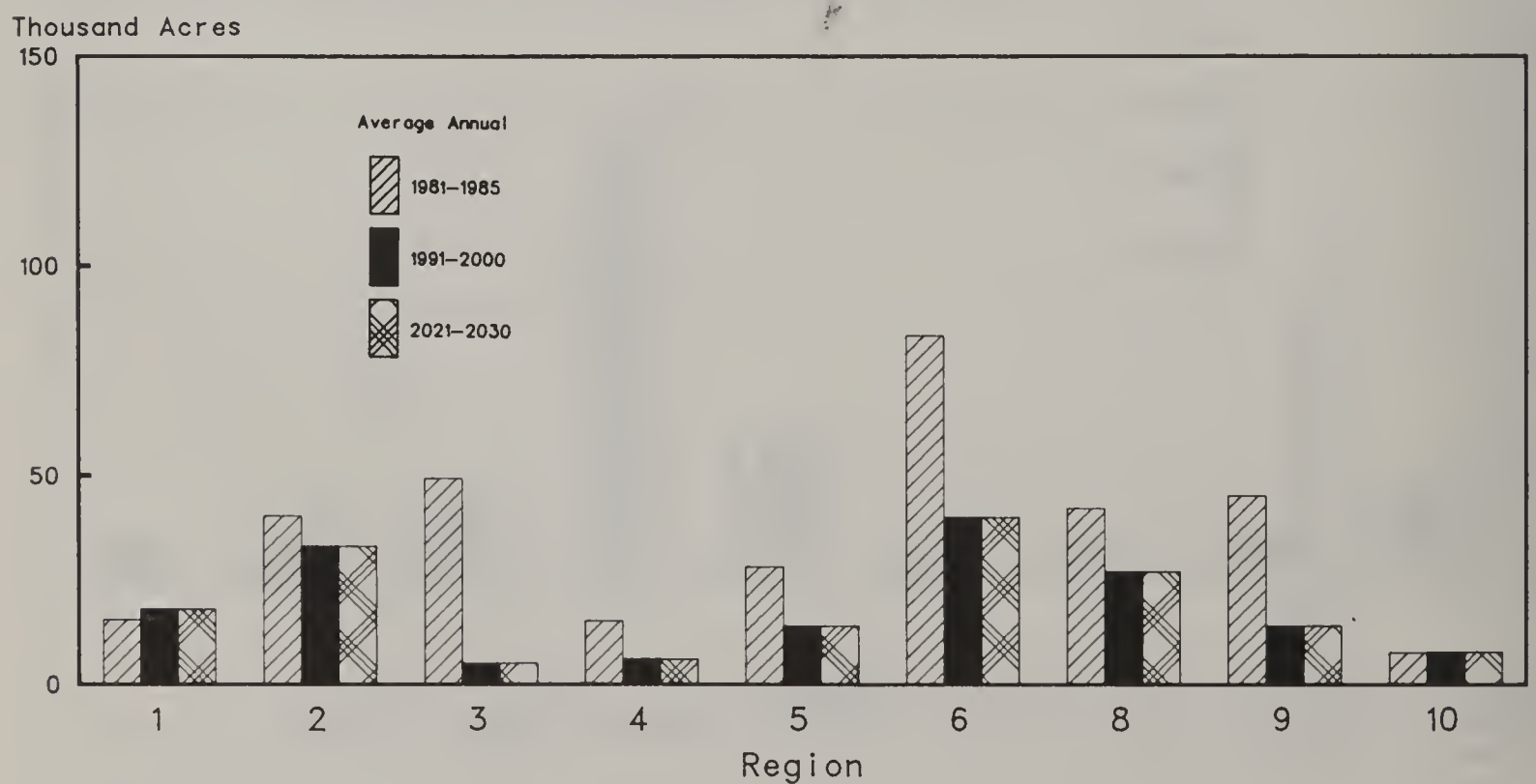


Figure 3.113

Regional Estimates-Alternative 4 Timber Stand Improvement (NFS)



For NFS, Alternative 4:

- Reduces availability of harvest residues for energy production below current availability.
- Permits stumpage price increases in excess of those anticipated under current trends.

State and Private Forestry.--A significant reduction in market outputs from the National Forest System might increase timber prices and thereby provide economic incentives for increased production of market outputs, particularly timber, from State and private forest lands.

Financial and technical assistance programs would be greatly increased--more than under any other Alternative--to emphasize proper sale, harvest, and processing techniques, as well as increased and improved timber growth.

Major increases in assistance for reforestation (Figure 3.114) and timber stand improvement (Figure 3.115) during the period 1981-2030 would significantly increase the private timber production attributable to Federal-State cooperative programs. Assistance in preparing timber for harvest (Figure 3.116), and numbers of woodland owners assisted, would increase (Figure 3.117). Similarly, major wood volume increases would be realized from increased wood utilization assistance (Figure 3.118).

Research.--Timber management research would provide new published guidelines for managing major forest types on public lands to enhance multiresource values. New management strategies that incorporate regeneration with genetically improved stock, intensive early culture, and multiresource management alternatives would be developed for private forest ownerships. Emphasis would be to increase nonmarket goods on NFS lands and all goods on private forest lands.

Forest products and utilization research: Information would be provided to NFS concerning optimum utilization practices that would increase nonmarket outputs on National Forest lands. Publications would report on the optimum utilization of low-grade eastern hardwood forests. An information handbook would be published to explain environmentally acceptable methods of treating wood products to extend service life. Publications would be produced on new processing systems that ensure greater utilization of wood products from each harvested tree.

Forest engineering research results would document cooperative efforts with NFS to determine the most effective harvesting systems to maintain public land productivity. These publications would indicate the effects of not harvesting the products from public lands on national production and on future harvest. Responsible parties would be informed of the harvesting method needed to maintain public lands at a level to provide products required to fulfill national needs. Harvesting systems research related to private lands would be accelerated.

Figure 3.114

Regional Estimates-Alternative 4 Reforestation (S&PF)

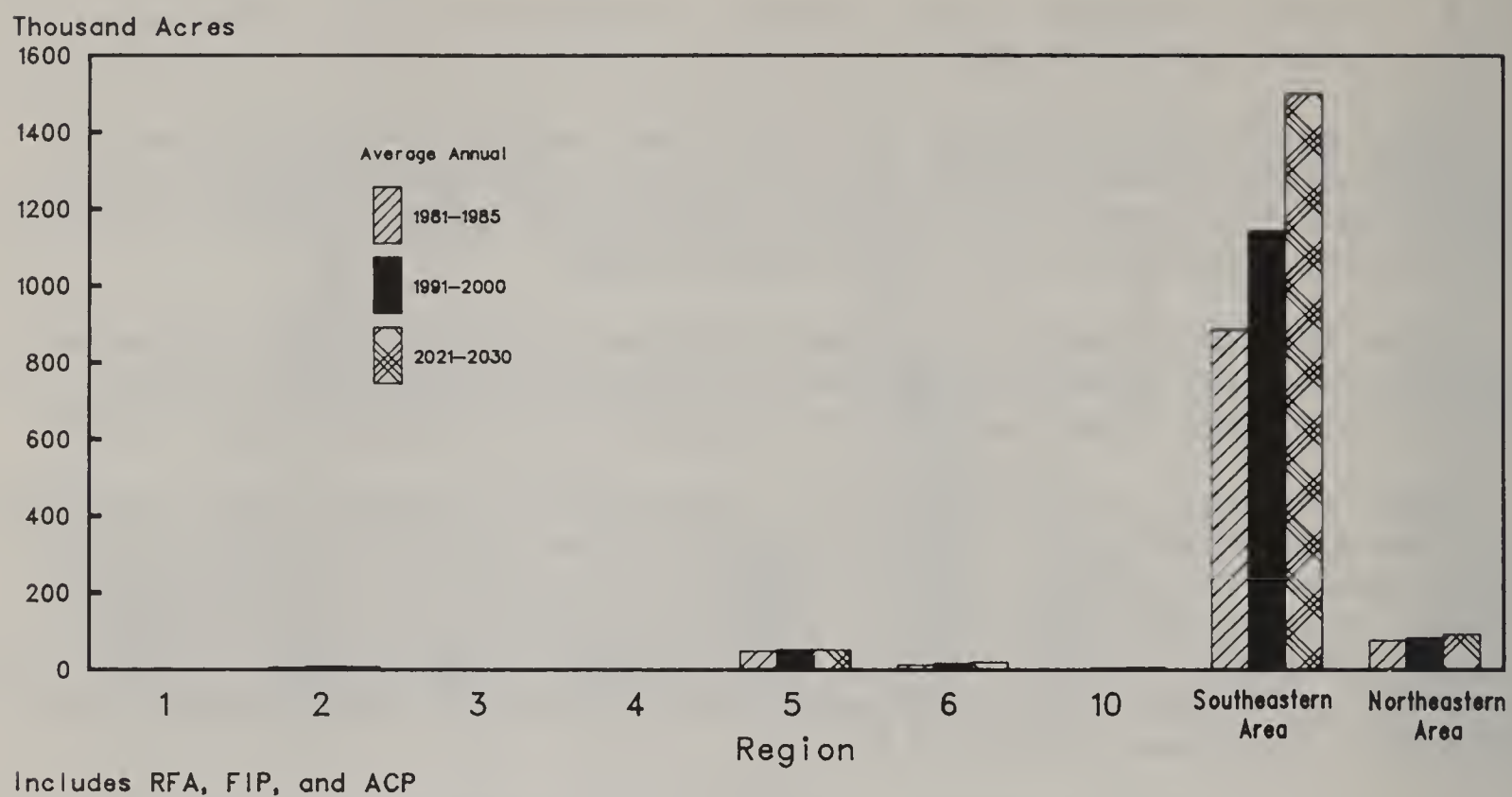


Figure 3.115

Regional Estimates-Alternative 4 Timber Stand Improvement (S&PF)

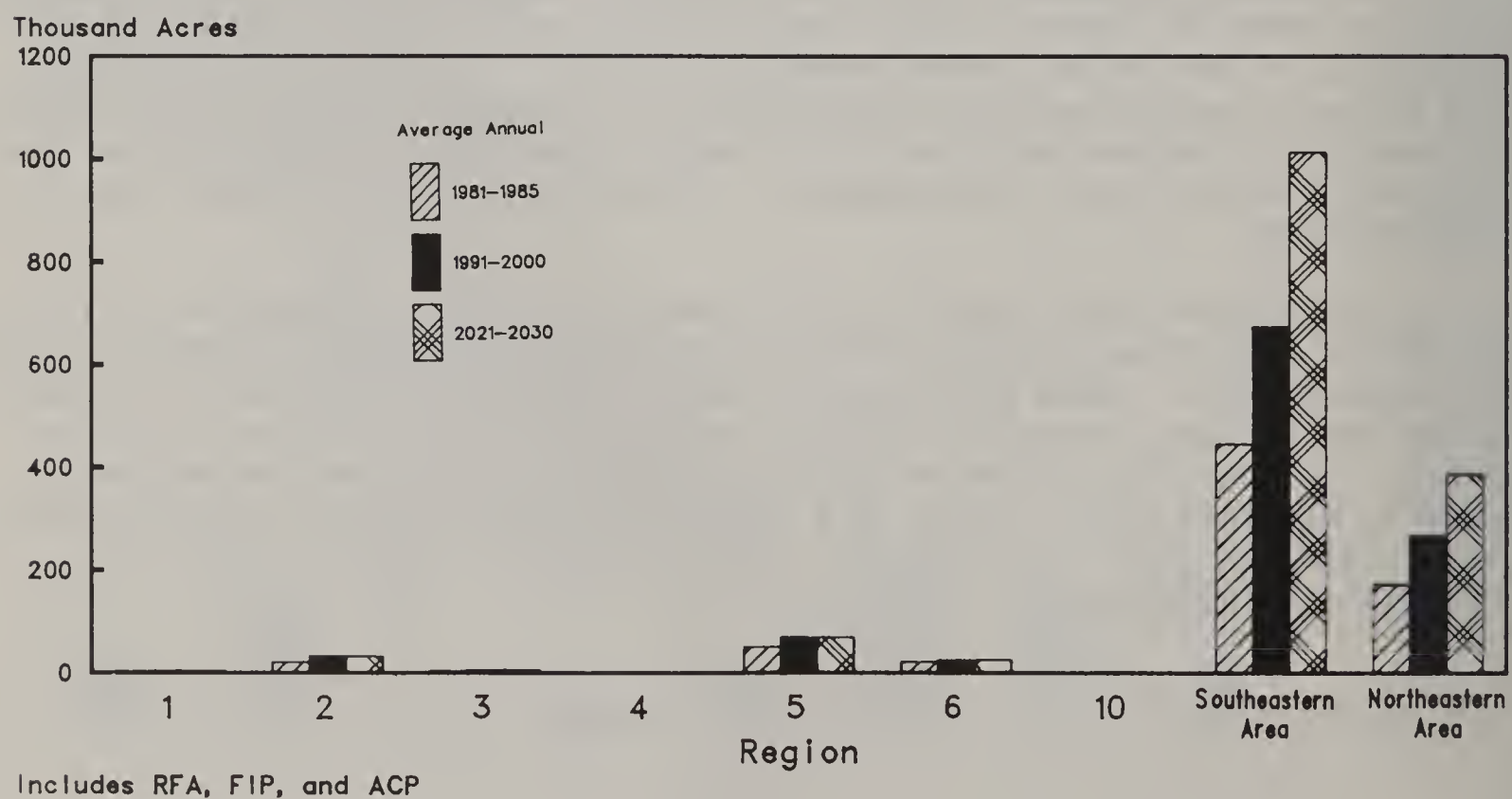


Figure 3.116

Regional Estimates-Alternative 4 Timber Prepared for Harvest (S&PF)

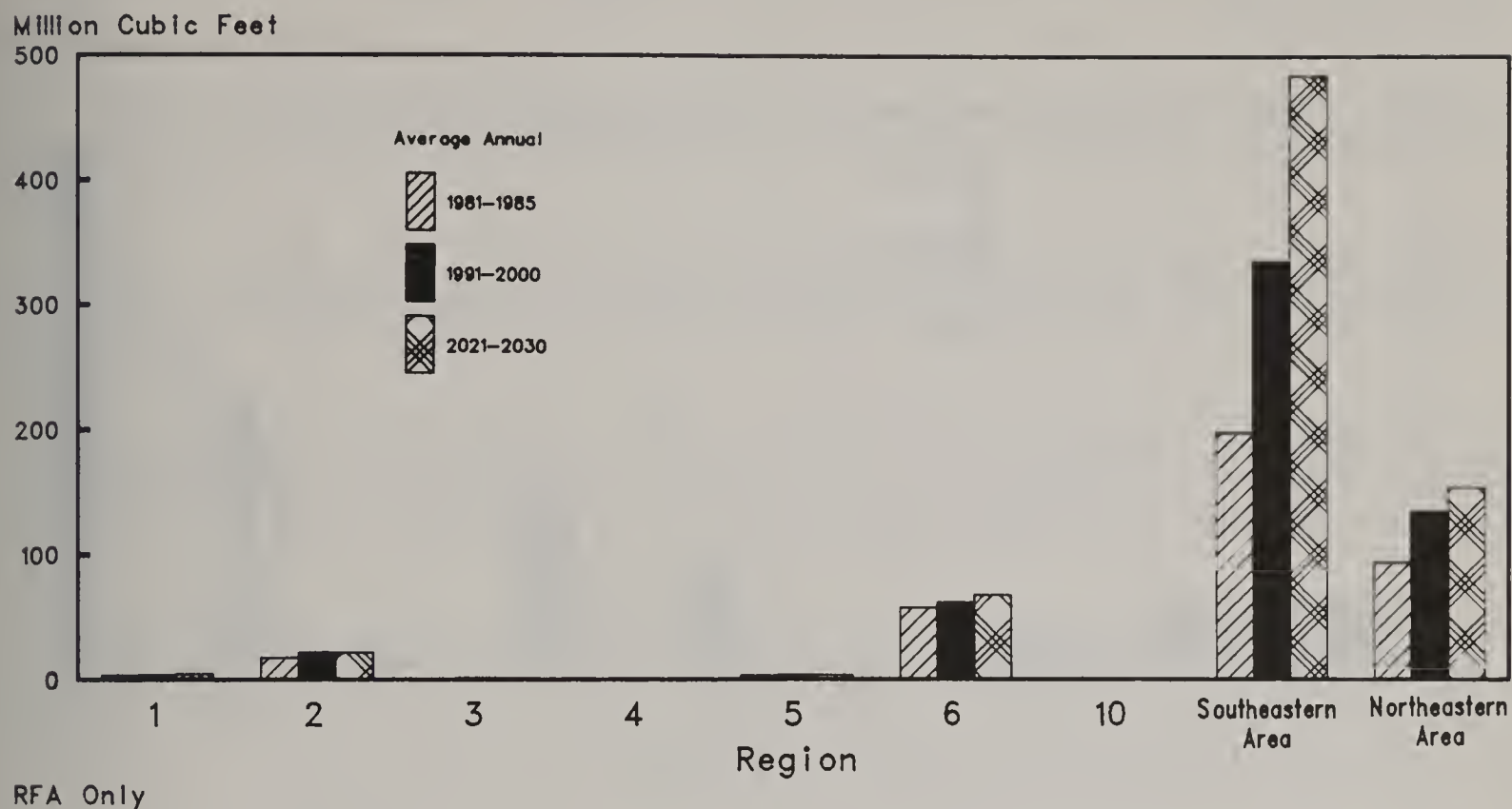


Figure 3.117

Regional Estimates-Alternative 4 Woodland Owners Assisted (S&PF)

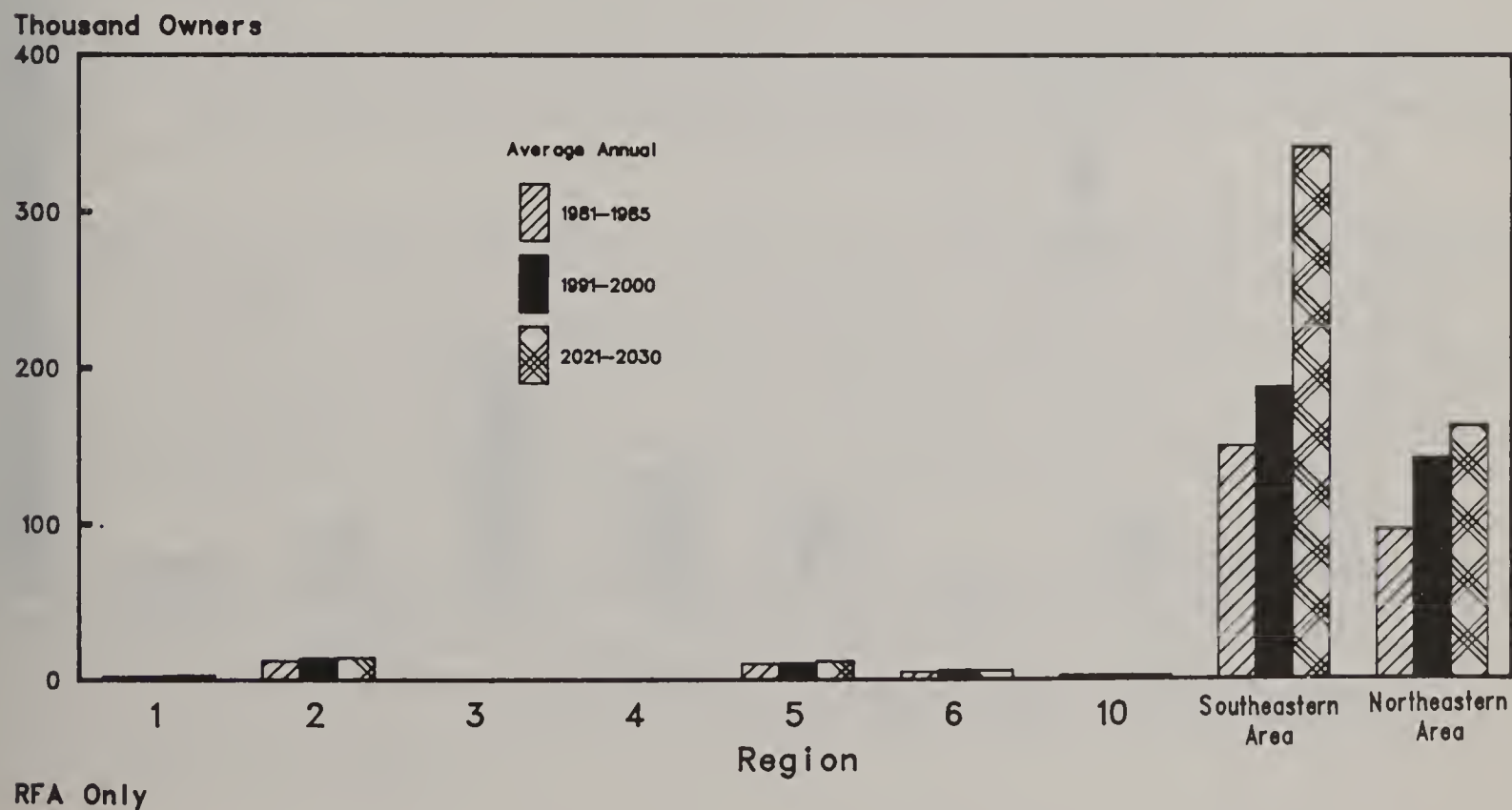


Figure 3.118

Regional Estimates-Alternative 4 Improved Wood Utilization (S&PF)

Million Cubic Feet

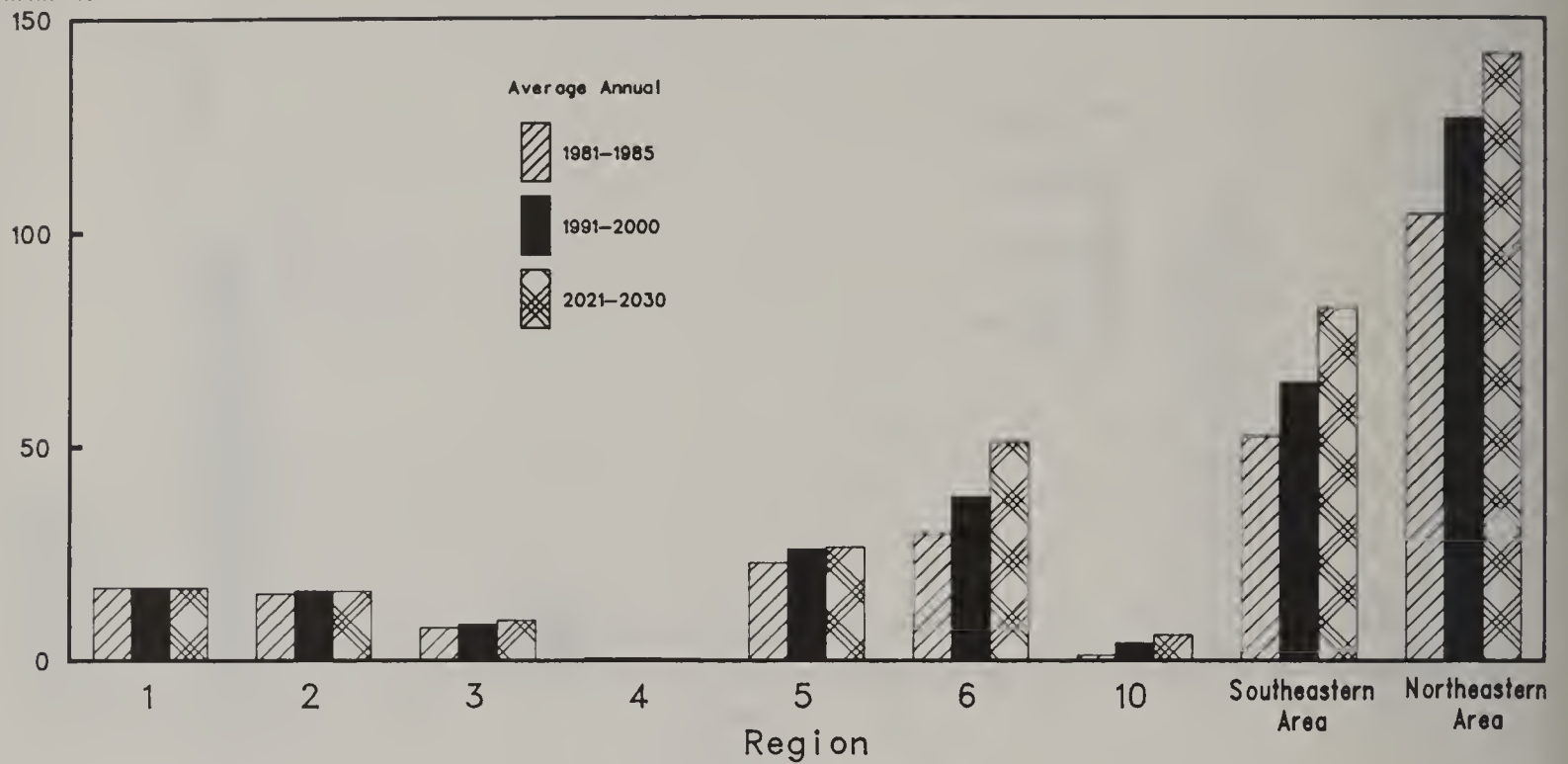
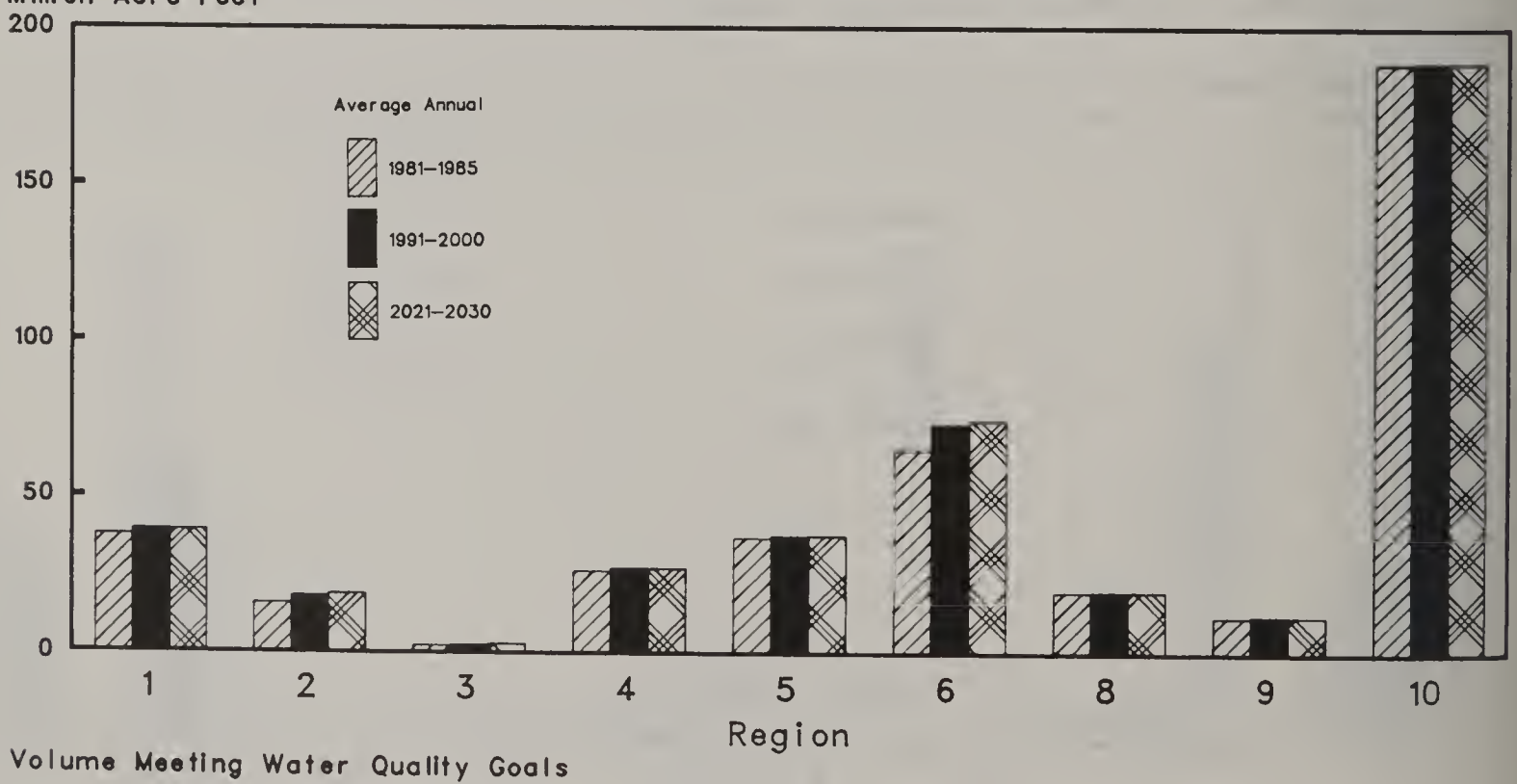


Figure 3.120

Regional Estimates-Alternative 4 Water Quality (NFS)

Million Acre Feet



National Goals

Technical water support services, NFS.--Provide level of technical water support services needed to enhance water quality for recreational and environmental objectives.

Water quality improvement, NFS.--Intensively implement water resource improvements needed to meet recreational and environmental water quality objectives.

Water yield, NFS.--Limit implementation of water yield improvement practices to those needed to meet nonmarket recreational and environmental objectives.

Cooperation with others, S&PF.--Coordinate and assure planning and implementation of water quality and water yield activities through assistance, cooperation, and involvement of private forest landowners and Federal, State, and local organizations responsible for water.

Water resource research.--Moderately increase development and use of scientific knowledge to provide onsite water resources of adequate quantity and quality for recreation and propagation of fish and wildlife, and eliminate discharge of pollutants with emphasis on maintaining aquatic ecosystems and ecological, geological, and other aquatic features of scientific, educational, or historical value.

Outputs and Activities

National Forest System.--Water activities in this element would be in addition to support services required to provide for nondegradation of the water resource by other resource activities. Water quality goals would be met for all water yielded from the National Forests by the year 2000. The amount of resource inventories would decrease, except for recreation related areas. Resource improvements would stress maintenance of existing water quality and quantity with selected improvements for recreation needs. Maintenance needs would generally decrease because of the reduced improvement program. Water quantity would remain unchanged. The volume of water meeting water quality goals is presented in figure 3.120.

State and Private Forestry.--Significantly more technical and financial assistance would be available for protecting and improving the quality, quantity, and timing of water yields from non-Federal forest lands. Emphasis would be placed on plans and practices to improve water quality, incorporate watershed management principles in forest resources planning, develop best management practices, improve municipal watersheds, improve streamside management, and implement onsite and offsite soil stabilization practices.

Research.--Research would determine the water resource amenities and requirements for recreation and propagation of fish and wildlife, especially threatened and endangered species. Nonpoint source pollution would be assessed and its effect on aquatic ecosystems and water features of scientific and historic value would be identified and their water resource requirements evaluated.

National Goals

Operation, NFS.--Limit actions on mineral proposals giving priority to energy and to 1872 mining law operations.

Assistance to States and private landowners, S&PF.--Provide increased assistance to States and private landowners for planning related to mineral operations and for reclamation of disturbed lands.

Surface environment and mining research.--Develop and use more scientific knowledge to meet water quality standards for streamflow from mined areas; improve esthetics, recreational opportunities, wildlife habitat, and range and timber productivity of selected mined areas; maintain integrity and undisturbed ecosystems near mined areas; and protect and maintain sites of significant ecological value.

Outputs and Activities

National Forest System.--Alternative 4 would provide limited actions on processing requests to commence mineral operations on National Forest System lands within requirements of laws and regulations. Supervision of the on-the-ground activities would be limited to legal requirements.

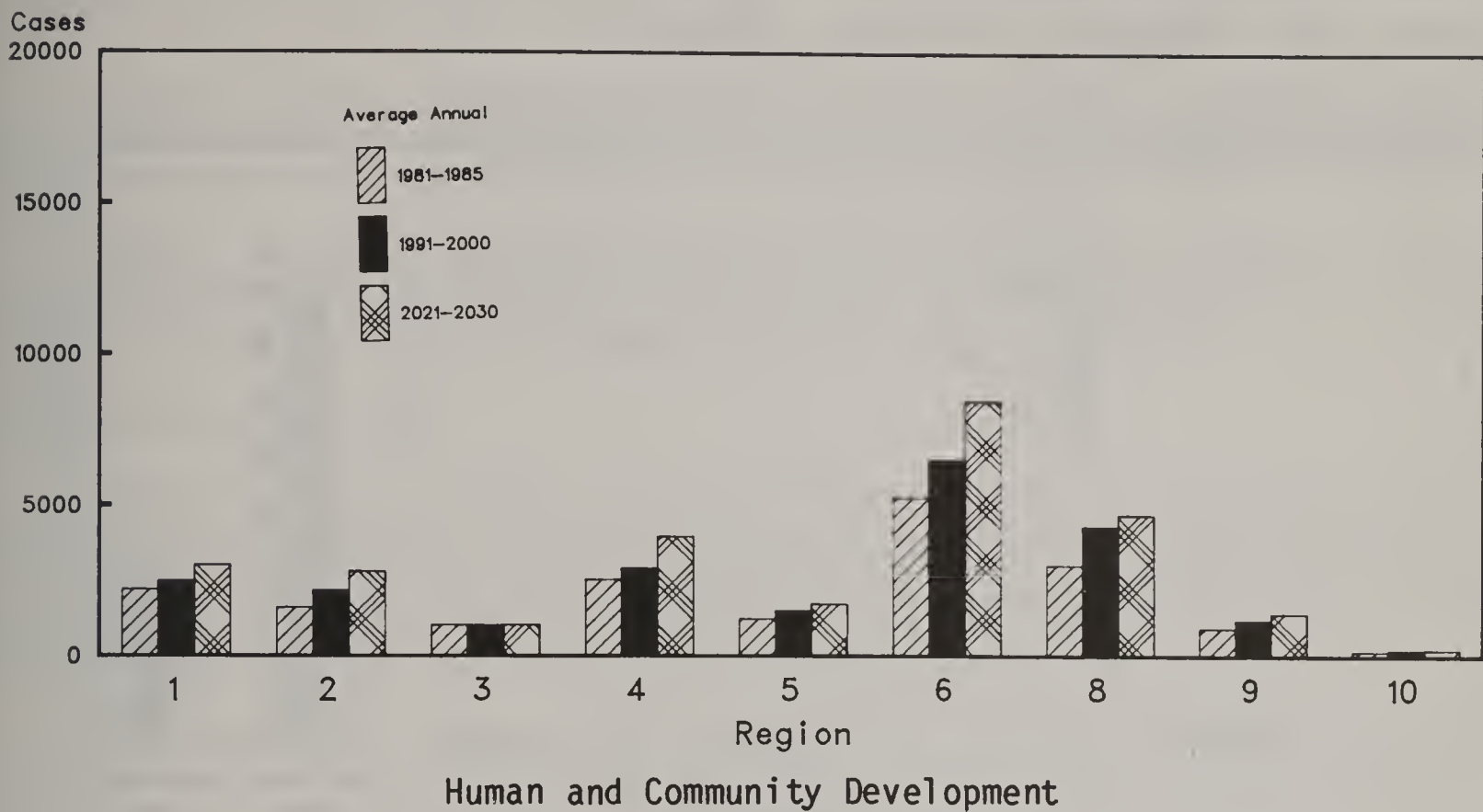
Emphasis at this program level, for low-level market outputs from National Forest System lands and for high-level market outputs from State and private lands, would not be practical when applied to mineral commodity production, because the mineral potential (both for quantity and for variety) on State and private lands is less than the potential on National Forest System lands.

The number of operating plans that are processed and reported, involving National Forest System lands, would be about 16,100 in the year 1981. This number is expected to increase, by the year 2030, to 27,400 (figure 3.121). The program would not provide for developing public information or for improving mineral operation methods and reclamation techniques. Land management planning advice concerning the mineral potential of areas under consideration would be reduced to a minimum.

State and Private Forestry.--Technical assistance to State forestry agencies and coordinating functions in mined land reclamation on non-Federal lands would be accelerated. Current problems, as well as anticipated mid-range developments in surface mining, would be addressed.

Research.--Research would evaluate the chemical and physical properties of mine wastes, identify potential pollutants (including heavy metals), and develop techniques for revegetation to minimize erosion and meet streamflow water quality standards. Techniques would be developed and published to rehabilitate sites, improve esthetic and recreational opportunities, wildlife habitat, and timber and forage production. Associated undisturbed ecosystems and sites of ecological, scientific, and educational values would be identified and protective techniques developed and tested.

Regional Estimates-Alternative 4 Mineral Leases and Permits (NFS)



National Goals

Employment and training programs (NFS, S&PF, and Research).--Provide a high level and broad range of employment and training programs for youth, older Americans, and the disadvantaged. Emphasize programs that promote understanding of the natural environment and overall social benefits.

Urban and community forestry cooperation, S&PF.--Significantly increase cooperative urban forestry programs.

Urban and community forestry research.--Substantially increase scientific knowledge to maintain, utilize, and protect urban forests; and integrate urban forest management and planning into the total urban development process.

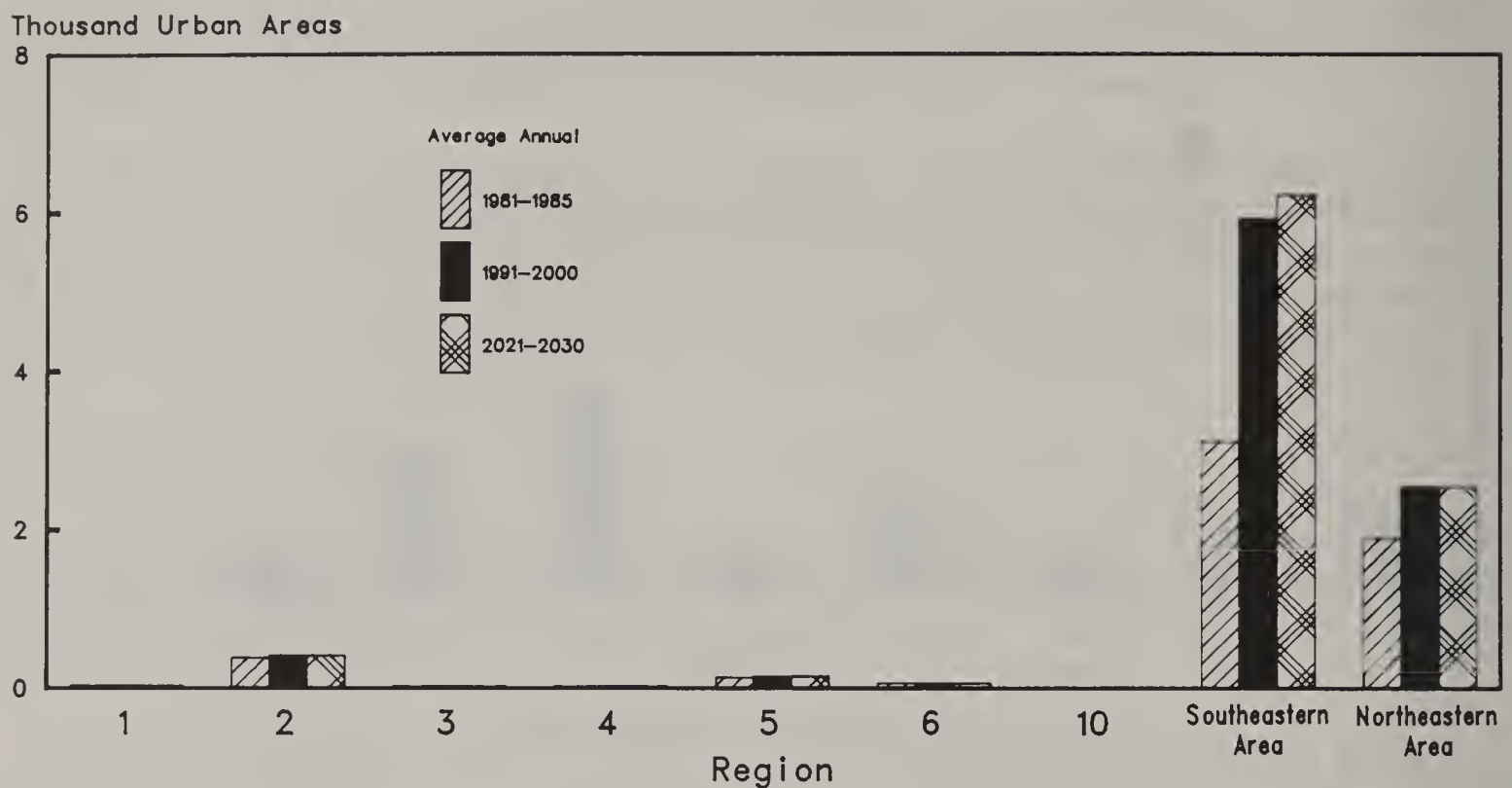
Outputs and Activities

National Forest System.--Emphasis on environmental awareness and educational programs for the disadvantaged would be the main features of Alternative 4. Programs such as the Youth Conservation Corps and the Job Corps would have the highest priority. The labor-intensive programs would be increased but their efforts would be channeled into recreational and environmental awareness.

The human resource programs staff would work at all levels to make the public aware of the various opportunities and activities supported by the National Forest System. Alternative 4 would provide the largest staff, and the most money and enrollees.

Figure 3.122

Regional Estimates-Alternative 4 Urban and Community Forestry (S&PF)



State and Private Forestry.--Significant increases in financial and technical assistance to States and cities for urban and community forestry would provide much more Federal encouragement for cooperative efforts to plan urban forestry programs, to maintain urban trees, and to utilize wood from trees in urban areas. The assistance would emphasize the achievement of long-term goals and objectives as well as short-term critical needs. Special efforts would be made to direct this additional assistance to smaller communities that lack sufficient urban forestry assistance in the private sector. Regional variations in the anticipated number of urban areas assisted are illustrated in figure 3.122.

Research.--Research would develop processes to select and develop urban and community forests, produce quality nursery stock, plant, grow, improve, maintain, protect, and replace urban and community forests. Information exchange systems and monitoring technology related to urban and community forestry programs would be developed.

Protection

National Goals

Protection, NFS.--Provide insect and disease management, fire use and management, and law enforcement, with special emphasis on protection of nonmarket outputs and adjacent private lands.

Air quality, NFS.--Provide air quality management with emphasis on meeting standards and studying and managing air quality related values.

Cooperation with others, S&PF.--Accelerate and intensify technical assistance, cooperation, and cost sharing for insect and disease control and rural fire prevention and control.

Insect, disease, and fire management systems research.--Intensify basic and applied research and development of new and improved insect, disease, and fire management systems for high-level nonmarket resource outputs from NFS.

Social, economic, and environmental effects research.--Intensify research on methods to identify, assess, and predict net social, economic, and environmental effects of insects, diseases, air pollutants, and fire.

Outputs and Activities

National Forest System.--Fire protection would only protect and maintain basic resources, except in areas of high nonmarket values where the protection from and use of fire would be employed to enhance nonmarket values. Fuels management would concentrate on protection of high value areas. Visual impacts from fuel modification projects would be minimized.

Fire management outputs on NFS lands are reflected in the Fire Management Effectiveness Index--a measure of the cost of protection, plus the net damage per thousand acres protected. Estimates for the nine NFS Regions are shown in figure 3.123. Regional data are shown for fuelbreaks and fuel treatment in figure 3.124.

Significant aspects of Alternative 4:

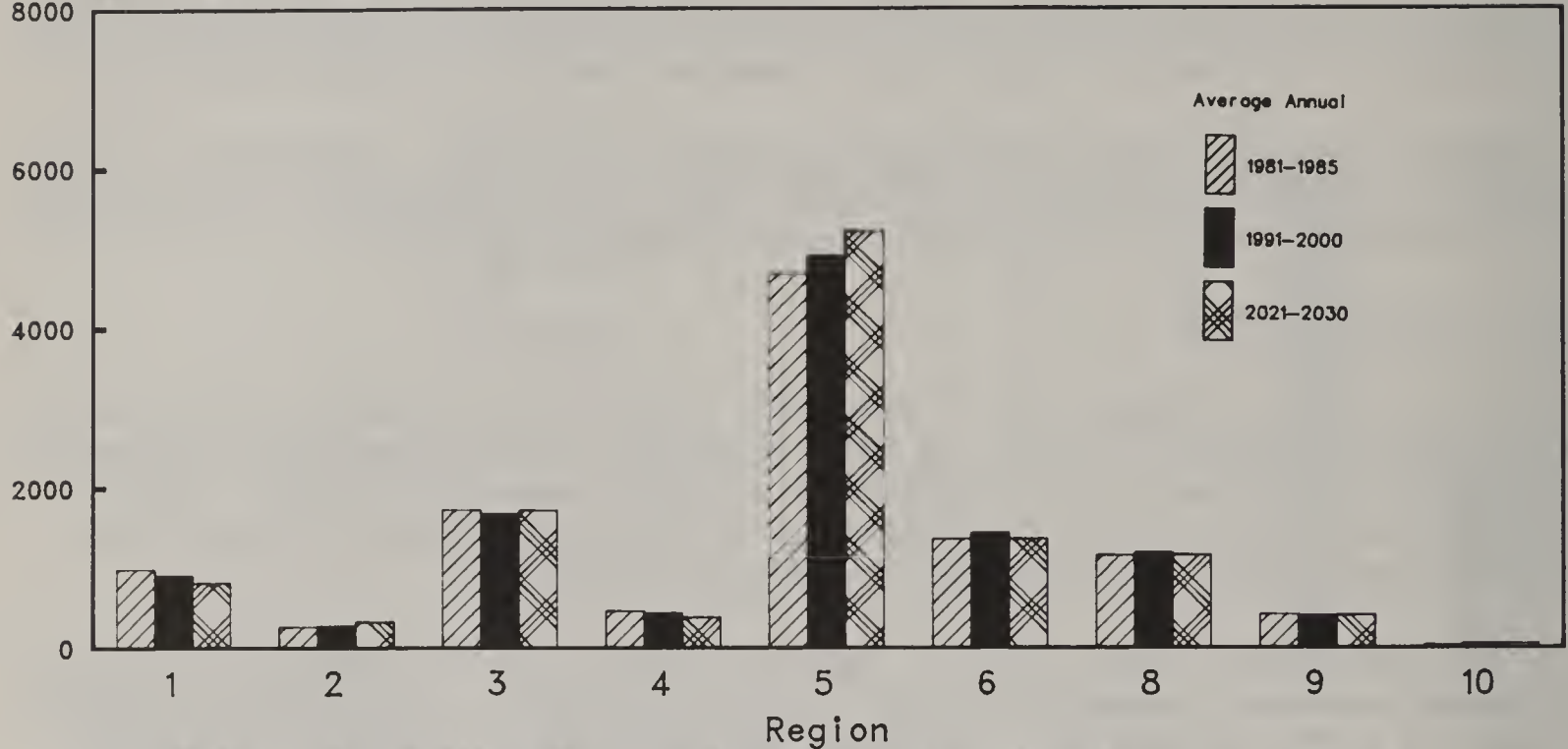
- The initial index value is low; it climbs to the year 2005 when planned fuel treatment will be completed, then declines.
- Air quality receives a high level of management to protect nonmarket values.
- Law enforcement would concentrate on the protection of facilities and the safety of the forest users.
- Emphasizes insect and disease management activities that affect visual impact, recreation, wildlife, wilderness, and human and community development.

State and Private Forestry.--Insect and disease control: Direct actions on National Forest System lands and cooperative actions on other public and private forest lands for insect and disease prevention, detection, evaluation, and control would be increased. Regional variations on acres surveyed are illustrated in figure 3.125. Within the National Forest System, the protection of nonmarket resources would be emphasized. Detection and evaluation surveys would increase and intensify, especially on State and private forest lands. Insect and disease losses would be reduced through silvicultural thinning and stronger State programs. New technical assistance and cost-sharing programs, such as urban tree protection and protection of wood in use, would be implemented. Integrated pest management would emphasize the protection of nonmarket outputs on National Forest System lands and market outputs on State

Figure 3.123

Regional Estimates-Alternative 4 Fire Management Effectiveness Index (NFS)

Dollars/Thousand Acres
8000

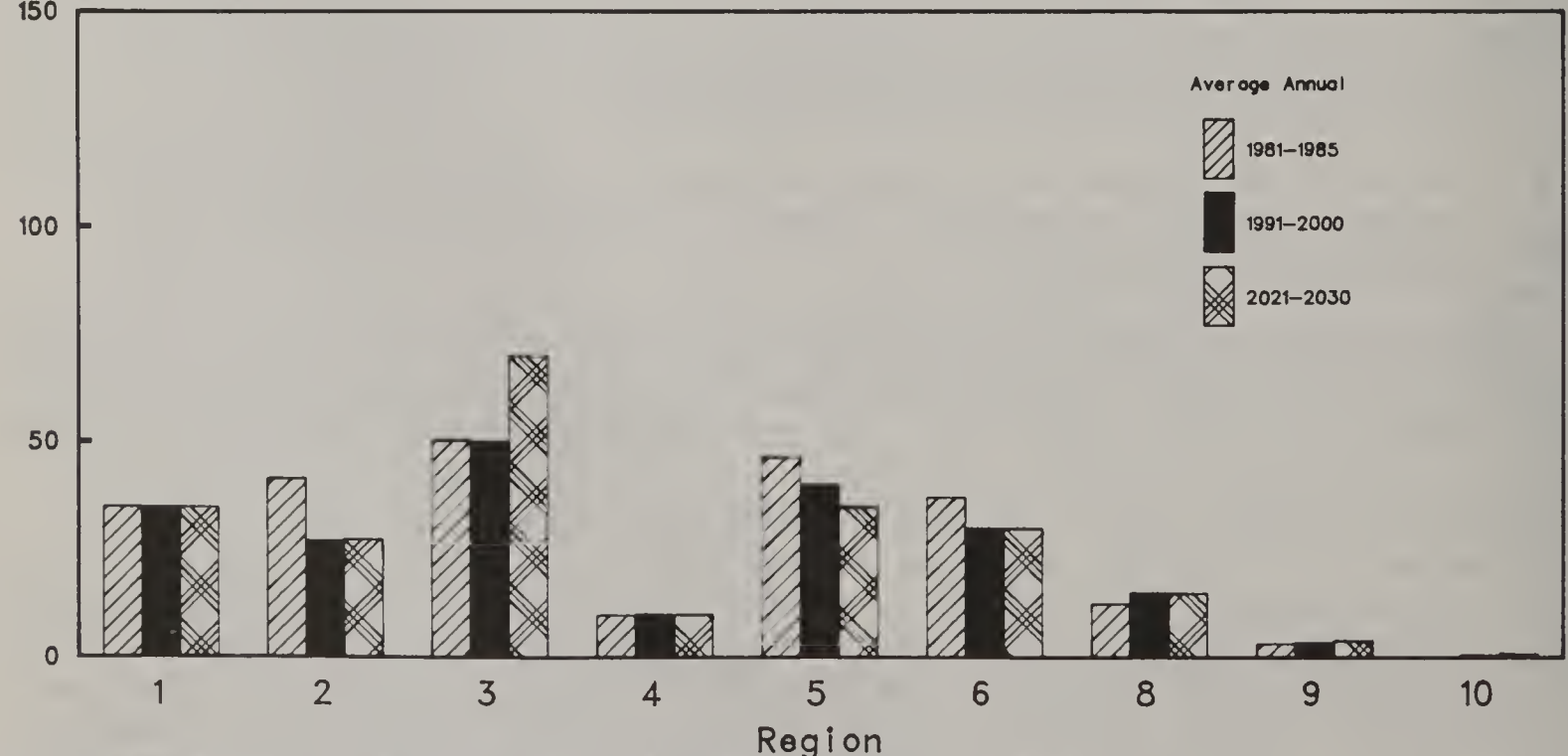


Fire Management Effectiveness Index is a Measure of Cost Plus Loss

Figure 3.124

Regional Estimates-Alternative 4 Fuelbreaks and Fuel Treatment (NFS)

Thousand Acres
150



Includes Fuelbreak Construction and Treatment of Natural Fuels.
Excludes Treatment of Activity Fuels.

and private lands. Cost sharing and technical assistance to the States would be increased. Additional insect and disease specialists would provide more intensive training to Federal and State field personnel for detection and prevention and for increased technical assistance.

Rural fire prevention and control: Substantially increased Federal financial, technical, and related assistance for rural fire prevention and control would help State Foresters or equivalent State officials obtain the goals outlined in their 1974 Fire Protection Analysis. Federal assistance would be increased in fire prevention techniques and programs. State fire personnel would be well trained and experienced. Increased fuel treatment would reduce fire hazards. Efforts to improve the efficiency of fire planning and fire-fighting operations would be accelerated, as would the implementation of new systems and methods in State fire organizations. Increased fire protection would enhance environmental conditions including the habitats of some of the rare and endangered animals and plants. A high level of rural fire protection would encourage private landowners to invest in management practices designed to produce wood fiber and other forest products and values. Assistance provided for rural community fire protection is expressed in terms of approved applications in figure 3.126. Fire losses would be reduced in most parts of the country as illustrated in figure 3.127. In Alaska (Region 10), reported acreage burned is expected to continue to rise due to large increases in the area to be included under the State fire protection program, without commensurate increases in program size.

Research.--Fire and atmospheric sciences research: Scientific knowledge and technology would permit integrated fire management systems and improved fire prevention techniques to be implemented. This would also permit the development of improved fire suppression and fire use methods. These systems would support high nonmarket outputs from National Forest lands, as well as high outputs from State and private lands.

Forest insect and disease research would be intensified on methods to identify, assess, and predict the net social, economic, and environmental effects of insects and diseases, commensurate with high-level nonmarket outputs and high-level market outputs from State and private forest and rangelands. Research would emphasize assessment of effects on recreation, wilderness, wildlife and fish habitats, and urban and community forest development. Research would emphasize pest management techniques on NFS nonmarket resource outputs, such as recreation, wilderness, and wildlife and fish habitats. Pest management techniques would be developed for high-level outputs from State and private forest and range lands. New and improved pest management decisionmaking guidelines would be tested and published for field use.

Lands

National Goals

Land management planning, NFS.--Provide a moderate level of land and resource management planning, and accelerate related special studies.

Land status, NFS.--Provide a moderately high level of landline location and marking, title claims, land exchange, and acquisition. Maintain land status data systems records to meet management planning and program commitments. Facilitate early completion of Native and State land selection in Alaska.

Figure 3.125

Regional Estimates-Alternative 4 Insect and Disease Surveys (S&PF)

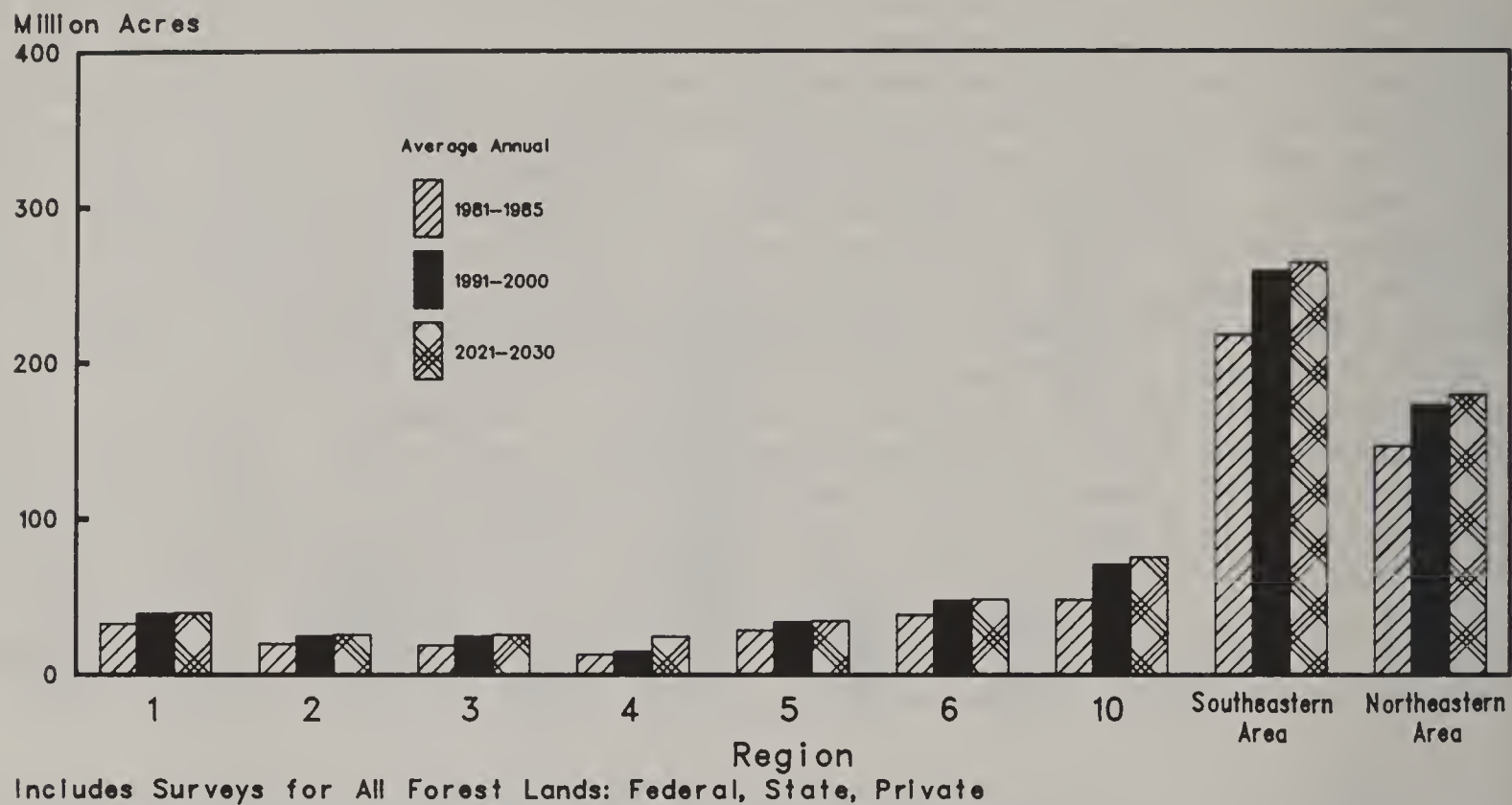
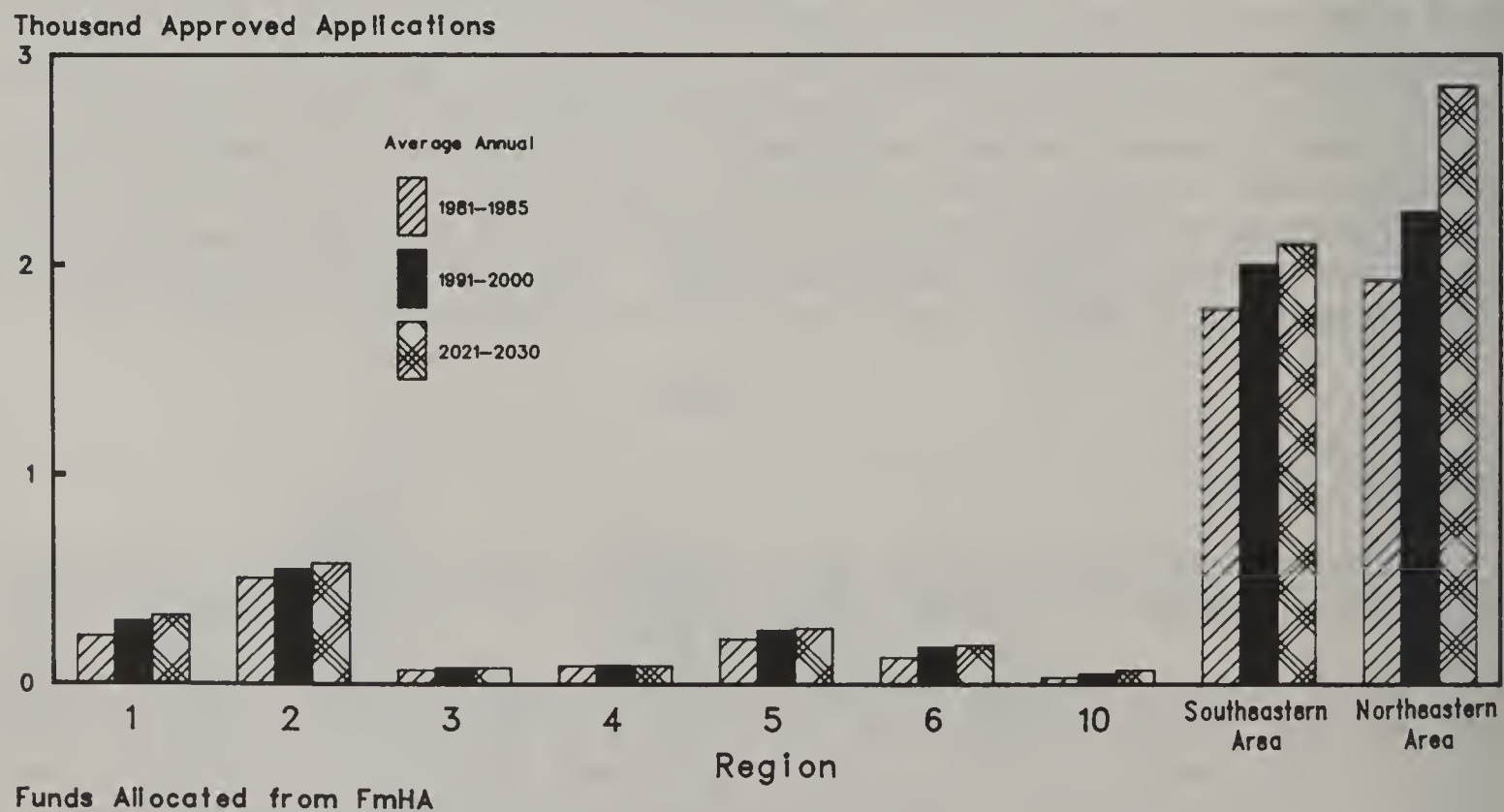


Figure 3.126

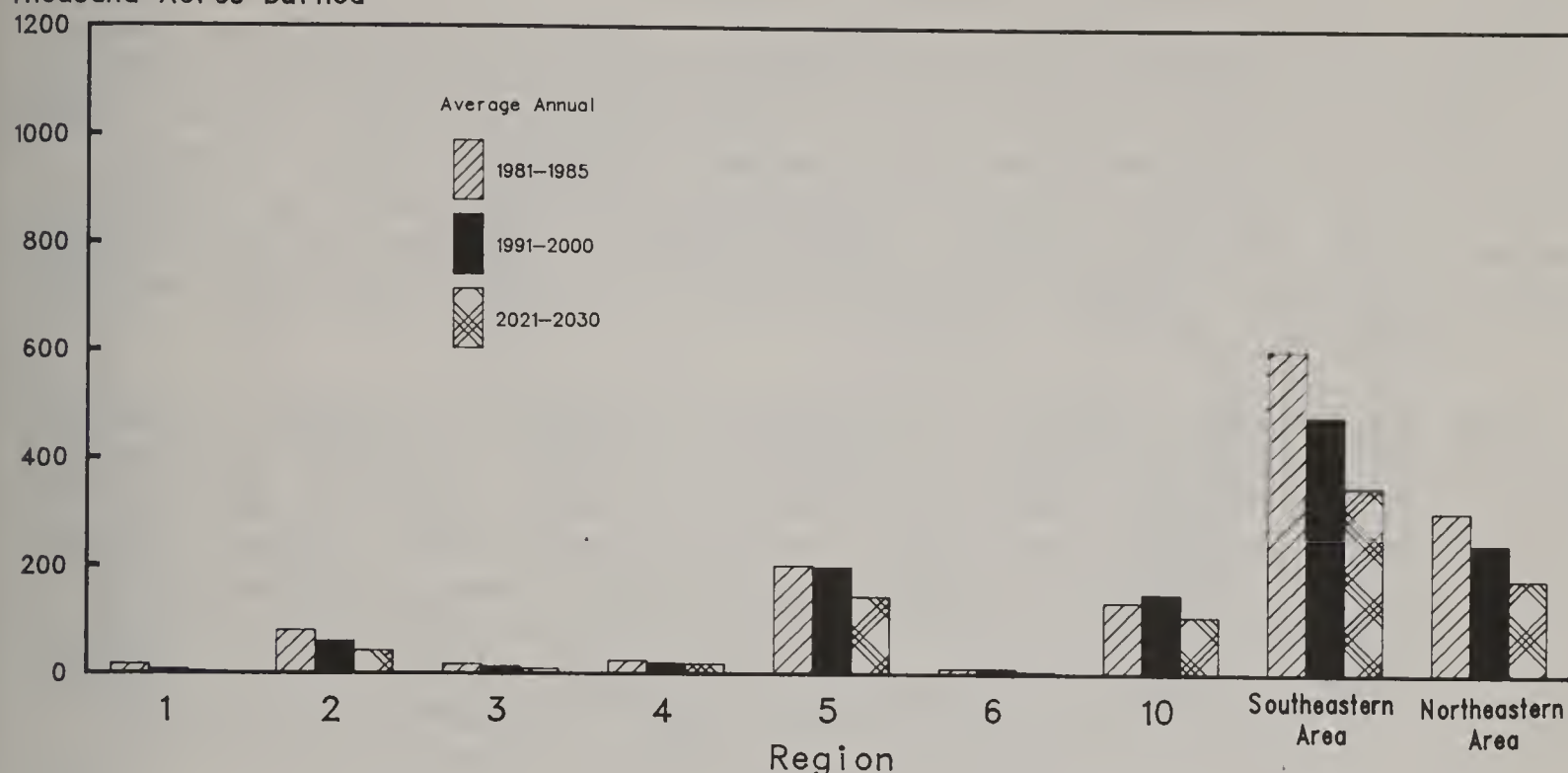
Regional Estimates-Alternative 4 Rural Community Fire Protection (S&PF)



Regional Estimates-Alternative 4

Fire Loss on Protected Area (S&PF)

Thousand Acres Burned



Special land uses, NFS.--Plan and provide for special land uses to ensure minimum impact on nonmarket outputs.

Cooperation in State forest resource planning, S&PF.--Substantially increase cooperation and technical assistance to States for forest resource planning.

Forest resource economics research.--Increase development and use of scientific knowledge to provide improved economic analyses of resource management and use alternatives with emphasis on all outputs from State and private lands and nonmarket outputs from NFS lands.

Renewable resource evaluation research.--Develop and use scientific knowledge to provide adequate inventory information for evaluations of all resources with emphasis on nonmarket outputs from all forest and range lands and for market outputs from State and private lands.

Outputs and Activities

National Forest System.--Land and resource management plans would be completed for all lands within the National Forest System by the mandatory October 1985 date. Planning would be at a moderate level and intensity to ensure reliability. Special studies would be accelerated to ensure a high level of nonmarket outputs on National Forest System lands. Landline location, marking and status would be at a level to discourage potential trespass expected from an increase of resource output activities on adjacent private lands. Title claims activity would be increased moderately as private owners' efforts to develop use of their lands reveal title conflicts which must be resolved. Land purchases using Land and Water Conservation Funds would be at a high level until the program ends in 1989. Land purchases using regular (Weeks

Act) funding would be at a moderate level to acquire critically needed lands to improve the manageability of eastern National Forests, but substantially below optimum for efficient management. Land exchange and adjustments would be at a moderate level to resolve critical problems and improve landownership patterns which would enhance nonmarket outputs on National Forest land and production of both market and nonmarket outputs on State and private lands. For example, a land acquisition and exchange program would be pursued that would place heavy emphasis on lands needed for dispersed recreation activities, wildlife and fish habitats, and for watershed protection (figure 3.128). Special land uses would be primarily externally imposed. Needs of others for such uses of National Forest System lands would increase as a result of increases in the national economy. Efforts would be to plan for and fulfill reasonably justified requests for special uses. Existing uses would be managed to protect the public's interest.

State and Private Forestry.--Substantial increases in Federal financial, technical, and related assistance to States for forest resources planning would provide significantly more incentive to assemble, analyze, display, and report State forest resource data, to train State forest resource planners, and to consider forestry aspects during natural resource planning at the State and Federal levels. Assistance could be provided to most States requesting it; and funds to employ, train, and support State forest resource planners, or to contract for such services, would be generally available. State forest resource plans developed with Federal assistance would likely be thorough and detailed. Coordination among State forest resource planning, National Forest System land management planning, and RPA would be substantially strengthened. Figure 3.129 illustrates, on a Regional basis, the acreage for which States' forest resource plans would be prepared. Figure 3.130 shows the acreage included in multiresource forest management plans prepared for individual landowners.

Research.--Forest resources economics research would significantly increase knowledge needed for improved economic analyses to evaluate land and resource management and use alternatives. Economic data and analysis techniques would be available to manage for optimum output of all goods and services from State and private lands, and nonmarket outputs from National Forest lands. This research would provide outputs similar to Alternative 1, but with reduced attention to market outputs from National Forest lands.

Renewable resources evaluation research would significantly improve techniques for conducting and integrating resource inventories to specifications and standards required for most efficient management of all resources on State and private lands and nonmarket resources within the NFS. Significantly improved inventories and analyses of land, forage, recreation resources, wildlife habitat, and water would result, including evaluations of availability and use. Intensified inventories would be conducted which improve accuracy for more specific geographic areas and resource outputs. Inventories would be completed at intervals to provide up-to-date data which would enable land and resource management planners to emphasize nonmarket resources and State and private market resources. Costs and benefits resulting primarily from alternative private land management practices would be determined for a wide variety of forest types. The effects of public policies on the production of timber and other outputs primarily from private lands would be determined.

Figure 3.128

Regional Estimates-Alternative 4 Land Purchase and Acquisition (NFS)

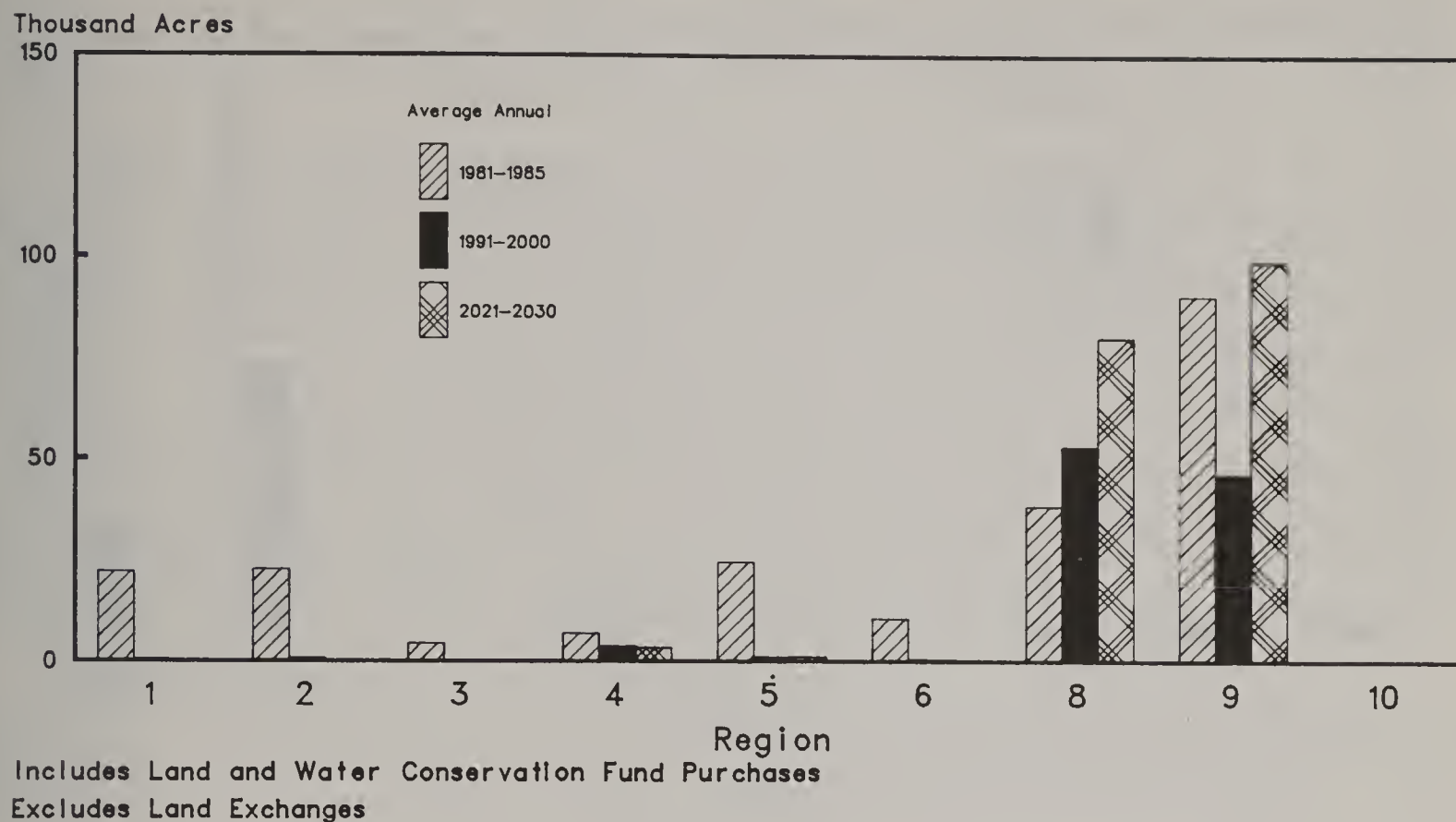
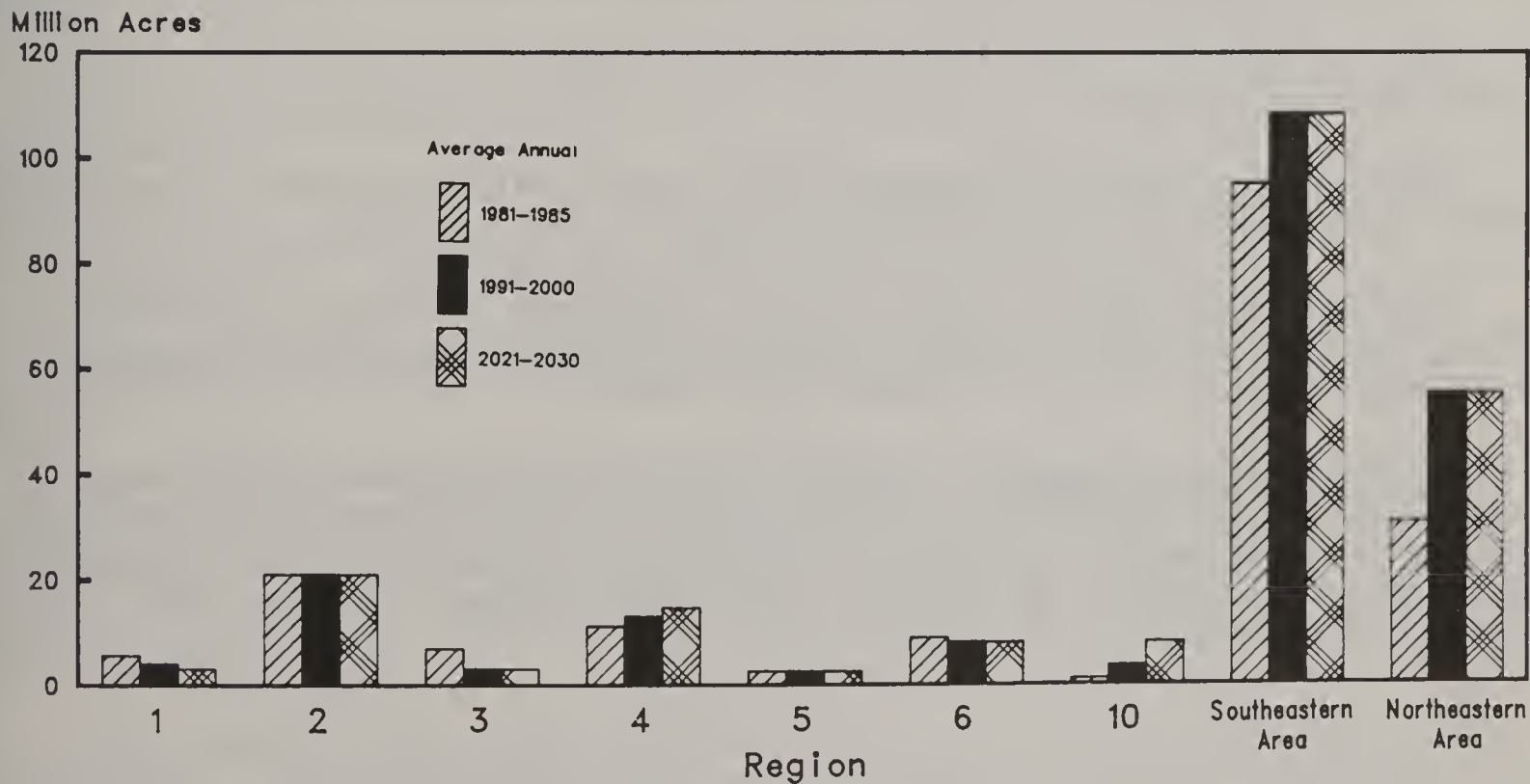
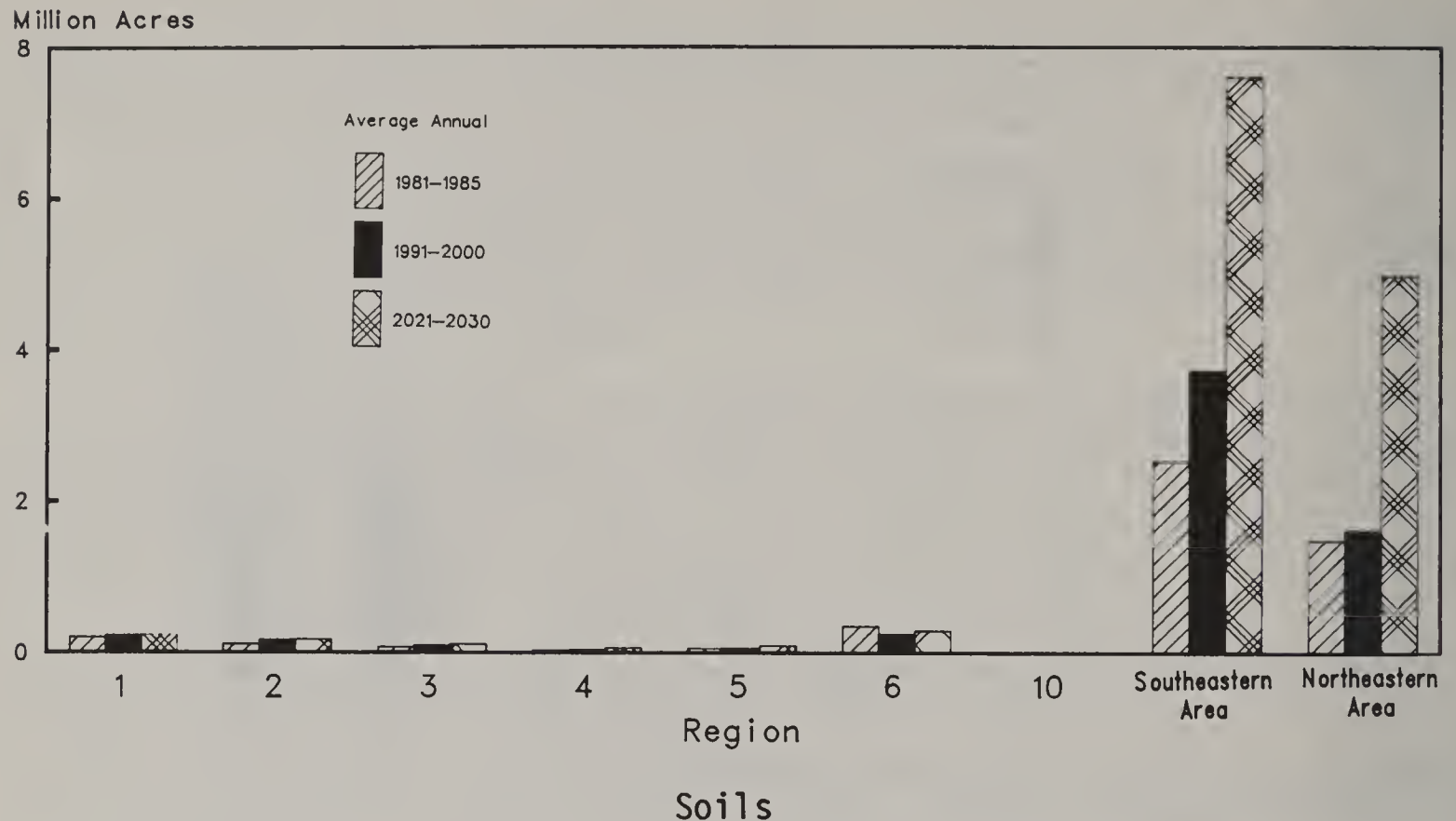


Figure 3.129

Regional Estimates-Alternative 4 State Forest Resource Planning (S&PF)



Regional Estimates-Alternative 4 Landowner Forest Management Plans (S&PF)



National Goals

Technical soil support services, NFS.--Provide technical soil services needed to maintain or improve soil productivity for recreational and environmental objectives.

Soil resource improvement, NFS.--Selectively implement soil resource improvements, to enhance environmental and recreational values.

Soil inventories, NFS.--Emphasize soil inventories that aid in environmental assessment.

Abandoned mineland reclamation, NFS.--Fully mitigate adverse impacts of mineral extraction on National Forest lands.

Technical assistance, S&PF.--Provide increased technical assistance and training in soil data interpretations for forest management purposes, in cooperation with the Soil Conservation Service.

Soil management research.--Conduct substantial research effort to develop and use scientific knowledge about soil to maintain water quality necessary for recreation, fish, and wildlife; maintain natural ecosystems; and maintain ecological, geological, and other features of sites with scientific, educational, or scenic value.

Outputs and Activities

National Forest System.--Soil activities in this element are in addition to support services required to maintain soil productivity and to prevent degradation of the soil resource by other resource activities. The amount of resource inventories would decrease, except for recreation-related areas. Resource improvements would stress maintenance of existing soil productivity with selected improvements for recreational needs (figure 3.131). Maintenance needs would generally decrease because of the reduced improvement programs.

State and Private Forestry.--Significantly more technical assistance and training in soil data interpretations for forest management purposes would be available to State Foresters or equivalent State officials and, through them, to owners and managers of private forest lands. These interpretations would include information on forest productivity, erosion hazard rating, road locations, and harvesting and site preparation techniques to protect the soil resource. Cooperative technical assistance, specifically for prime forest land mapping in high priority areas, would be provided by three field units (SA, NA, and the Alaska Region). Six field units (the Northern, Rocky Mountain, Southwestern, Intermountain, Pacific Southwest and Pacific Northwest Regions) would incorporate any assistance for prime forest land mapping within the State forest resources planning program in the lands element.

Research.--Research would evaluate soil erosion processes and develop techniques for reducing erosion, thus maintaining terrestrial ecosystems and improving streamflow water quality. Soil resources necessary for maintenance of ecological, scientific, and educational sites would be evaluated.

Facilities

National Goals

Utility systems, NFS.--Concentrate on installation and restoration of existing utility systems serving nonmarket activities. Develop new systems to serve nonmarket activities. Limit restoration of systems supporting market activities to meet required current minimum environmental standards.

Building construction, NFS.--Construct buildings that support non-market outputs.

Building maintenance, NFS.--Maintain buildings to current health and safety standards. Continue conversion for energy conservation.

Communications, NFS.--Concentrate on restoring and upgrading communication systems.

Transportation including roads and trails construction, NFS.--Concentrate on restoration of existing principal transportation networks to a low maintenance system protecting soils and waterflows. Provide access to areas important to nonmarket outputs. Close access to areas with sensitive ecosystems.

Water impoundments, NFS.--Concentrate on restoration of existing water impoundments. Accelerate upgrading and development of water impoundments to support recreation and wildlife programs.

Figure 3.131

Regional Estimates-Alternative 4 Soil and Water Quality Improvement (NFS)

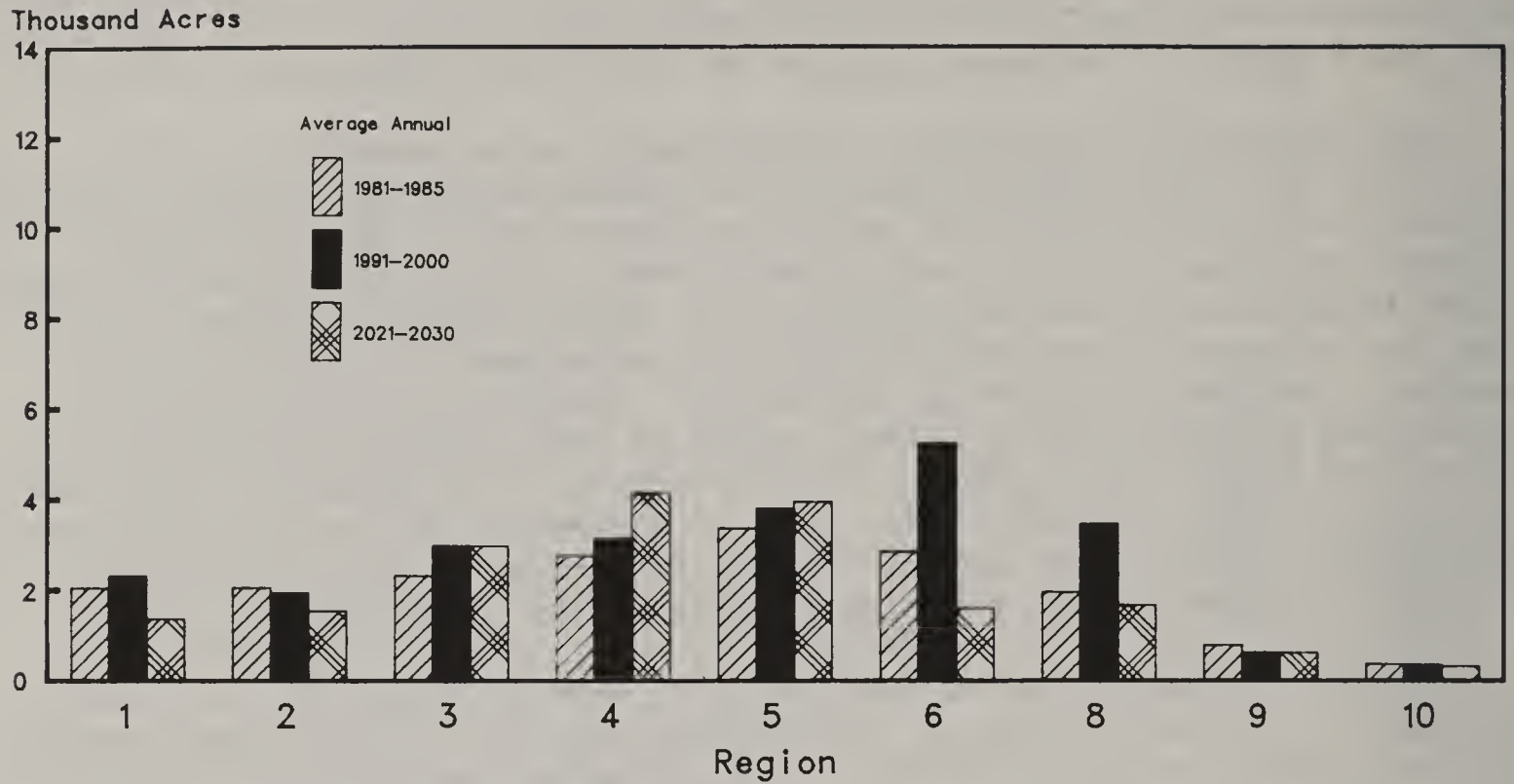
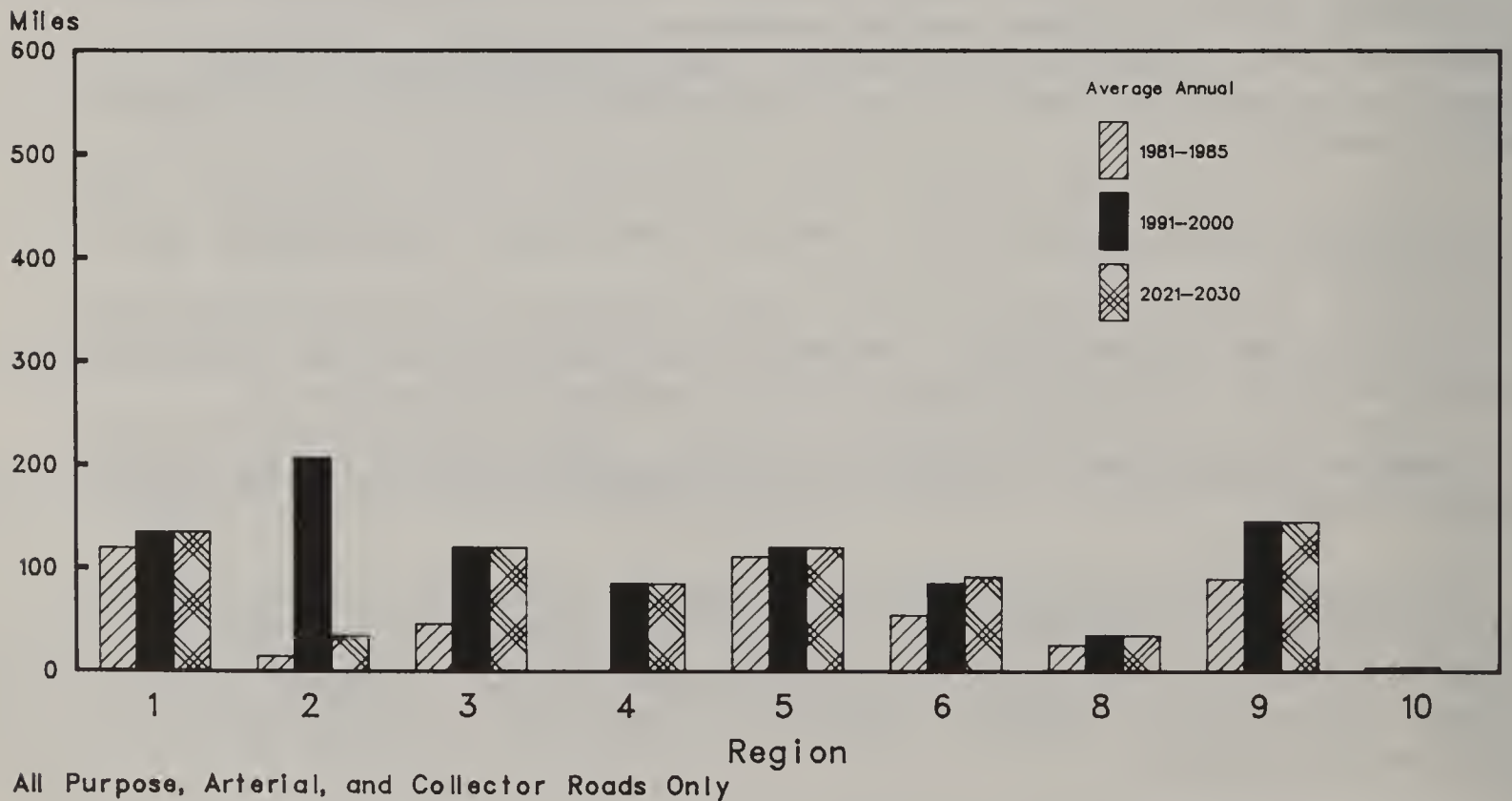


Figure 3.132

Regional Estimates-Alternative 4 Road Construction/Reconstruction (NFS)



Research construction.--Continue proposed new construction and maintenance of Research Laboratories to meet research goals of all program elements. Continue conversion for energy conservation.

Outputs and Activities

National Forest System.--Shift capital investment programs to nonmarket resource emphasis. This program would increase funding to develop the esthetic and recreational values of public land. Management systems would be more extensive than intensive. Distribution and dispersment of users would be essential. Relocation of facilities and new development would be emphasized under changed criteria for landform, water, scenic, and wildlife values. Forest user health, safety, and convenience would be primary in program development.

Figure 3.132 displays the work to be accomplished by Regions to complete that portion of their individual principal transportation systems needed to support nonmarket outputs and associated activities. The Northern, Rocky Mountain, Southwestern, and Intermountain Regions and the Southern and Eastern Regions would have the greatest workloads.

Research.--New construction and maintenance of research laboratories would be needed to accomplish research goals of all program elements.

Environmental Effects

The environmental effects of this Alternative--physical-biological, economic, and social--are summarized on the following pages. For a more detailed description of these effects, see chapter 4.

Physical-Biological Effects

Under Alternative 4, water quality goals would be met with no significant change in yield over the present condition. Air quality would increase in the short term but have the potential for long-term reductions as a result of increased emissions from wildfires. Visual quality would increase slightly in the short term and substantially in the long term. Most of the endangered and threatened species, and the other management indicator species, would be enhanced. Cultural resources would not receive any negative impacts, and opportunities for development and enhancement would be high under this Alternative.

Economic Effects

The Alternative 4 present net worth over the 50 years is \$46.2 billion using a discount rate of 7-1/8 percent (table 3.16).

Timber and water contribute over 60 percent of the total net values. Recreation, minerals, wildlife and fish, and wilderness also produce large net benefits. There are no resource elements with negative values.

All Regions have a positive present net worth. Over 54 percent of the total value is contributed by the Pacific Coast (Regions 6 and 5).

All regions have positive values in the recreation, wildlife and fish,

and water elements. The Pacific Southwest (Region 5), and the South (Region 8) contribute 50 percent of the recreation values (32 and 18 percent, respectively). Also, Region 1 of the Rocky Mountains produces over 36 percent of the water value.

Timber programs in the Pacific Coast (Regions 6 and 5) are responsible for the large positive values in the timber resource elements.

Minerals in Regions 2, 3, and 4 of the Rocky Mountains contribute over 77 percent of the positive values (36, 10, and 31 percent, respectively).

Returns to Government.-Returns to government from gross sale (or lease) of National Forest System resources for Alternative 4 are expected to be \$1,587 million in 1981, \$1,928 million in 1985, \$2,465 million in 1995, and \$4,421 million in 2025.

These returns include cash payments, required deposits from purchasers to finance activities resulting from timber sales, (such as Knutson-Vandenberg deposits), and credits allowed for work performed by the purchasers.

The Alternative 4 annual revenues (in either dollars or credits) are as follows:

(Million Dollars)				
Activity	1981	1985	1995	2025
Recreation	12	14	18	22
Grazing	23	17	18	18
Timber	1,395	1,646	2,000	3,520
Minerals, NFF <u>1/</u>	<u>20</u>	<u>27</u>	<u>38</u>	<u>63</u>
Total NFF <u>2/</u>	1,450	1,704	2,074	3,623
Minerals, BLM <u>3/</u>	<u>137</u>	<u>224</u>	<u>391</u>	<u>798</u>
Total Government	1,587	1,928	2,465	4,421

1/ (NFF) National Forest Fund.

2/ Historically, approximately 25 percent of the National Forest receipts have been paid to States for redistribution to local county governments. Payments are also made by BLM. These payments are in lieu of taxes.

3/ Mineral royalties collected from public domain National Forest System lands and reported by Bureau of Land Management.

Table 3.16--NFS present net worth for Alternative 4
discounted at 7-1/8 percent by resource element & region

(Million Dollars)

Element	NFS Regions										Total by Element
	1	2	3	4	5	6	8	9	10		
Recreation	146	1,128	479	884	2,878	821	1,632	840	210	9,018	
Wilderness	128	564	67	308	980	119	-14	244	1	2,397	
Wildlife & Fish	245	793	416	557	126	504	278	284	193	3,396	
Range	51	72	50	-23	-6	-3	-2	-3	-	136	
Timber	41	-146	24	-23	2,790	13,938	131	-421	-567	15,767	
Water	4,163	1,284	117	1,806	1,144	1,553	247	62	1,360	11,736	
Minerals <u>1/</u>	-55	1,342	380	1,169	6	-37	95	254	596	3,750	
Total by Region	4,719	5,037	1,533	4,678	7,918	16,895	2,367	1,260	1,793	46,200	

^{1/} Value for locatable materials other than uranium and thorium was not determined. This primarily impacts the values in Region 5.

Social Effects

The effects of Alternative 4 on the existing social structure would be the largest in comparison with effects of the other Alternatives. Nonmetropolitan areas that depend on existing Forest Service programs would face major changes. These areas generally are in the West and Southeast, with portions of the Midwest and East also likely to be affected. The key social variables most affected would include community economies, community identity, opportunities for leisure, and housing. Effects from Alternative 4 would be mixed in areas with rapid growth rates.

This Alternative would forego the most future choices. This Alternative was tied with Alternative 2 as the second most "conflict polarizing" choice. (See chapter 4 for definitions.)

ALTERNATIVE PROGRAM DIRECTION 5

(Forest Service programs would provide for moderate-level market and low-level nonmarket outputs on National Forests, and low-level market and nonmarket outputs on State and private forest and range lands.)

Alternative 5 is a continuation of present Forest Service programs on National Forest lands and on State and private lands. The relative prices for forest products would continue to rise, and gains in environmental quality would be steady. The market output levels on National Forest lands would be higher than Alternative 2. The programs directed toward nonmarket outputs and market outputs from State and private lands would continue to be relatively low compared to Alternatives 1, 3, and 4.

Program in Brief

National Forests

Alternative 5 places emphasis on maintaining a moderate level of range, timber, and mineral outputs. The effort to make optimum use of land and to assure a continuous flow of all goods and services would be maintained. Adverse impacts would be minimized, and the existing resources protected and conserved. Efforts to rehabilitate resources where deterioration has occurred would continue.

State and Private Forestry

State and Private Forestry programs would continue to provide relatively low levels of financial and technical assistance through State forestry agencies in support of selected high-priority market and nonmarket activities. Outputs attributable to Federal assistance would approximate current trends and be generally lower than projections in the 1975 Recommended Program. Only under Alternative 2 would federally assisted State and private forest outputs be lower than under Alternative 5. Any significant increase in forestry investments on State and private forest lands would result from State, local, and private initiatives, from federally supported initiatives, or other assistance.

Research

For Alternative 5 the research program would continue to provide an adequate scientific basis for effective management practices for all forest and range resources while minimizing adverse environmental impacts. Research efforts would be at a lower level than the base used for the national and regional programs for Research (Alternative 3). Efforts with cooperating universities and agencies would continue as in the recent past but would not be accelerated.

Human Resource Development

Alternative 5 would continue Forest Service involvement in this area and respond to the Nation's need as determined by future congressional action to expand or reduce the current programs related to natural resource management and development, including conservation education.

Summary of Program Outputs, Activities and Costs

Alternative 5 would slightly increase recreational opportunities on National Forest System lands, mostly in market related activities such as downhill skiing. Developed recreation use would increase from the present 80 million visitor days to 125 million in 2025, while dispersed use would increase more slowly, from 130 million visitor days to 183 million. This does not include wilderness use. Cooperative assistance for dispersed recreation and esthetic improvements would be included in multiresource forest management plans for private landowners who wish to take advantage of these opportunities.

About 20 million acres of National Forest System land would be recommended for additional wilderness designation--a moderate increase.

Wildlife habitat improvements on the National Forest System would increase modestly, from 2.3 million acre-equivalents in 1978, to 2.4 million in 1985. Anadromous fish habitat improvements would increase the annual contribution of the National Forests to the commercial salmon fishery by 2.2 million pounds in 1985 and 13.9 million pounds in 2005 through 2025. Cooperative assistance for wildlife and fish habitat improvement on non-Federal forest lands would continue at approximately the current level.

Livestock grazing on the National Forest System would increase 9 percent from the present 9.9 million animal-unit-months to approximately 10.8 million in 2025. Cooperative assistance for forage production on non-Federal forested ranges would increase through the planning period.

National Grassland management would emphasize use of the Federal land to demonstrate sound and practical principles of land use, and to exert a favorable influence for securing sound land conservation practices on associated private lands to help maintain a moderate level of range, timber, and mineral related outputs on both Federal and private lands.

National Forest System timber sale offerings would increase slightly, due to better utilization, from 12.2 billion board feet in 1978 to 13.2 billion in 2025. National Forest System reforestation would increase from 372,000 acres in 1988 to 420,000 in 2025. Continuing to harvest National Forest System timber at current levels would probably not alter the economic incentives for State and private timber production, and the Forest Service would continue to provide moderately low levels of cooperative assistance for growing and improving timber on those lands.

Water quantity would generally remain the same, and the percentage of water volume meeting water quality goals would increase during the Program's later years. Cooperative assistance for protecting and improving the quality, quantity, and timing of water yields from non-Federal forest lands would be increased moderately.

Moderate efforts would be made to process requests for mineral operations on National Forest System lands, with priority being given to energy and energy-related minerals. This would permit processing an anticipated 16,600 cases in 1981, increasing to 30,500 by 2030. Cooperative assistance for mined land reclamation on non-Federal lands would increase slightly.

Research would emphasize the production of knowledge and technology needed to support the current level of resource management on both public and private forest and range lands.

Human and community development programs on the National Forest System would continue at the present level. Cooperative assistance to States and cities for urban and community forestry would increase slightly.

The total Forest Service work force, in thousand person-years, necessary to perform the work included in this Alternative is as follows:

Base year 1978	1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2020- 2030
44.4	64.0	65.3	66.6	66.7	67.7	63.3	59.5	60.4	61.3	60.9

Table 3.17 displays a national summary of National Forest System projected program outputs, activities, costs, and returns to government for Alternative 5. Table 3.18 shows comparable data for State and Private Forestry programs. Table 3.19 summarizes the Research program. Costs by program area for Alternative 5 are shown in figure 3.133.

Table 3.17--Projected National Forest System program outputs, activities, and costs 1/

Alternative 5

PROGRAM ELEMENT AND OUTPUT/ACTIVITY	UNIT OF MEASURE	BASE YEAR 1978	ANNUAL UNITS									
			1981	1982	1983	1984	1985	1986-1990	1991-2000	2001-2010	2011-2020	2021-2030
RECREATION												
Developed Recreation Use (Includes VIS)	Million Recreation Visitor Days	79.6	85.4	89.0	92.8	94.1	97.2	102.0	110.3	115.6	120.4	125.3
Dispersed Recreation Use (Includes Wildlife & Fish)	Million Recreation Visitor Days	130.2	132.7	134.5	136.4	138.2	141.8	148.7	157.4	169.2	175.4	183.3
Trail Construction/Reconstruction	Miles	600	2500	2100	2000	1900	1800	1800	2000	1800	1900	1900
WILDERNESS												
Wilderness Management	Million Acres	15.3	31.6	32.5	33.0	33.5	34.2	34.2	34.3	34.4	34.5	34.6
WILDLIFE & FISH												
Wildlife Habitat Improvement	Thousand Acre-Equivalents	2330	2570	2380	2420	2240	2440	2320	1970	1510	1110	1140
Anadromous Fish Improvement	Thousand Pounds	--	0	107	317	992	2240	5380	10800	13900	13900	13900
RANGE												
Grazing Use (Livestock)	Million Animal-Unit Months	9.9	10.1	10.1	10.1	10.1	10.2	10.0	10.2	10.3	10.5	10.8
TIMBER												
Programmed Sales Offered	Billion Board Feet	12.2	11.7	11.7	11.9	11.9	11.9	12.3	12.6	12.7	13.0	13.2
Reforestation	Thousand Acres	411	423	454	461	469	467	372	382	394	409	420
Timber Stand Improvement	Thousand Acres	420	363	395	390	390	388	275	250	251	253	255
WATER												
Volume Meeting Water Quality Goals	Million Acre Feet	14.5	402	403	405	406	407	412	416	421	421	421
MINERALS												
Minerals Leases and Permits	Thousand Operating Plans	--	16.6	17.5	18.6	19.8	19.8	22.4	24.3	26.2	28.5	30.5
HUMAN & COMMUNITY DEVELOPMENT												
Human Resources Programs 2/	Thousand Enrollee Years	14.8	16.7	16.7	16.7	16.7	16.7	9.6	9.6	9.6	9.6	9.6
PROTECTION												
Fire Management Effectiveness Index	Dollars/Thousand Acres	1110	1360	1330	1330	1300	1300	1290	1280	1270	1300	1270
Fuelbreaks & Fuel Treatment	Thousand Acres	392	265	291	300	302	302	271	250	258	271	283
LANDS												
Land Purchase and Acquisition (Excludes Exchange)	Thousand Acres	117	217	208	207	207	208	358	76	103	134	145
SOILS												
Soil & Water Resource Improvement (Improved Watershed Condition)	Thousand Acres	--	17.8	20.8	22.1	23.0	24.1	26.8	24.4	17.5	17.6	17.6
FACILITIES												
Road Construction/Reconstruction (Arterial, Collector)	Miles	686	255	635	719	750	798	976	1070	1070	1060	391
RETURNS TO THE GOVERNMENT	Million Dollars	--	1098	1064	1152	1220	1290	1540	1802	2220	2856	3542
COSTS												
NATIONAL FOREST SYSTEM-												
Operational	Million Dollars	676	3/ 734	857	878	881	895	945	971	1008	1028	1033
Capital Investments 4/	Million Dollars	684	898	815	839	853	885	745	851	870	879	850
Backlog 5/	Million Dollars	61	40	47	48	46	37	32	25	--	--	--
Total Appropriated 6/	Million Dollars	1421	1672	1719	1765	1780	1817	1722	1847	1878	1907	1883
Allocated Funds 7/	Million Dollars	244	335	336	338	339	340	271	5	5	4	5
Total NFS	Million Dollars	1665	2007	2055	2103	2119	2157	1993	1852	1883	1911	1888

1/ All costs and returns are shown in constant 1978 dollars.

2/ Human Resource Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

3/ The 1978 base year figure has been adjusted upward in order to include the effect of the revised fire financing policy which calls for full funding of presuppression activities instead of relying on supplemental appropriations. The amount of the adjustment (92.4) is from the 1979 President's Budget.

4/ NFS capital investments are such things as: sale preparation--live volume; TSI/reforestation; range structural improvements; road and trail construction/reconstruction; wildlife and fish habitat improvement; developed recreation site construction; water and soil resource improvements; and fuel treatments.

5/ Backlog costs are shown here for information only and are included in capital investment costs.

6/ Total appropriated costs are the sum of operational and capital investment costs. NFS appropriated funds include all YCC and Cooperator Funds.

7/ NFS allocated costs include YACC and other human resource programs, O&C Grants, Land and Water Conservation, and other funds. Costs exclude payments to States and Counties, and Federal Highway Funds.

Abbreviations used: AUM = animal unit month; RVO = recreation visitor day.

Table 3.18--Projected State & Private Forestry program outputs, activities,
and costs 1/

Alternative 5

PROGRAM ELEMENT AND OUTPUT/ACTIVITY	UNIT OF MEASURE	BASE YEAR 1978	1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
RECREATION												
Technical Assistance for Dispersed Recreation	Thousand Acres	81	135	137	140	141	157	157	162	174	189	201
WILDLIFE & FISH												
Technical Assistance for Wildlife Habitat Improvement	Thousand Acres	170	144	148	153	158	162	186	240	267	288	307
RANGE												
Technical Assistance for Range Improvement	Thousand Acres	50	77	85	93	101	111	126	164	211	256	268
TIMBER												
Reforestation (RFA, FIP, ACP)	Thousand Acres	326	470	472	472	474	475	477	483	492	501	510
Timber Stand Improve- ment (RFA, FIP, ACP)	Thousand Acres	275	364	364	366	371	371	375	380	386	392	397
Timber Prepared for Harvest	Million Cubic Feet (MMCF)	225	256	257	263	263	263	265	268	268	268	268
Woodland Owners Assisted	Thousand Owners	165	229	230	231	234	235	240	252	254	257	259
Improved Wood Utilization	Million Cubic Feet (MMCF)	164	171	174	179	182	185	197	214	222	245	261
HUMAN AND COMMUNITY DEVELOPMENT												
Urban and Community Forestry	Thousand Urban Areas	7.0	2.5	2.5	2.6	2.6	2.7	2.9	3.2	3.2	3.4	3.4
PROTECTION												
Insect and Disease Surveys	Million Acres	600	428	470	510	550	742	764	614	636	636	636
Rural Community Fire Protection	Thousand Approved Applications	3.0	2.8	3.3	3.3	3.3	3.3	3.3	3.2	3.2	3.2	3.2
Fire Loss on Pro- tected Area	Thousand Acres Burned	1700	2/ 1990	2020	2050	2080	2140	2350	2250	2620	2450	2270
WATER, MINERALS, LANDS, AND SOILS												
State Forest Resource Planning	Million Acres	--	79	71	146	142	134	138	142	143	142	142
Landowner Forest Management Plans	Million Acres	3.2	3.6	3.7	3.8	3.8	3.8	3.8	3.8	3.8	3.9	3.9
Cooperative Technical Assistance	Person Years	--	41	43	44	44	44	44	45	47	47	46
COSTS												
STATE AND PRIVATE FORESTRY-												
Operational	Million Dollars	30	34	35	35	35	35	38	39	40	41	42
Capital Investments 3/	Million Dollars	50	53	61	61	61	61	60	61	65	62	63
Total Appropriated 4/	Million Dollars	80	87	96	96	96	96	98	100	105	103	105
Allocated 5/	Million Dollars	37	50	53	53	53	53	52	57	34	34	35
Total S&PF	Million Dollars	117	137	149	149	149	149	150	157	139	137	140

1/ All costs are shown in constant 1978 dollars.

2/ S&PF-Cooperative Fire Loss base figure is calendar year 1977.

3/ S&PF capital investments include such activities as: reforestation; timber stand improvement; preparation of landowner forest management plans; cooperative forest resource planning; insect and disease surveys; and fire management planning and fuel treatment.

4/ Projected estimates of funds appropriated to the Forest Service for cooperative forestry assistance under P.L. 95-313.

5/ Projected estimates of funds appropriated to other USDA agencies for programs which receive assistance from the Forest Service and State forestry agencies, including (1) forestry practices under the Agriculture Conservation Program and the Forestry Incentives Program funded through the Agricultural Stabilization and Conservation Service; (2) Rural community fire protection funded through the Farmers Home Administration; and (3) funds allocated to the Forest Service by the Soil Conservation Service for the forestry aspects of watershed planning, flood prevention, river basin surveys and investigations, and resource conservation and development.

Table 3.19.--Planned Research program activities and costs

Alternative 5

FOREST RECREATION RECREATION	Knowledge to assess and predict recreation supply and demand and protect recreation resources.
WILDERNESS RESEARCH	Knowledge to manage and protect wilderness and ecological features of extremely high value.
WILDLIFE, FISH, AND PLANT HABITAT RESEARCH	More scientific knowledge about selected game, threatened and endangered species and their habitats.
RANGE RESEARCH	Continue development of scientific knowledge to improve environmentally acceptable methods of livestock production on forest and range lands.
TIMBER MANAGEMENT RESEARCH	Knowledge to support extensive culture on better sites and to integrate extensive management.
FOREST PRODUCTS UTILIZATION RESEARCH	Knowledge to use whole trees, dead and dying trees and residues to improve forest environment.
FOREST ENGINEERING RESEARCH	Increased knowledge on harvest and removal of dead trees and residues to improve forest environment.
WATER RESOURCE RESEARCH	Knowledge to maintain on-site water quality and quantity, increase off-site yields in water-short areas and eliminate pollutants.
SURFACE ENVIRONMENT AND MINING (SEAM) RESEARCH	Knowledge to maintain mined area streamflow quality ecosystem, and protect valuable sites.
URBAN AND COMMUNITY FORESTRY RESEARCH	Increased knowledge to assess benefits of urban forests and biological and physical processes of urban forests.
FIRE AND ATMOSPHERIC SCIENCES RESEARCH	Moderate increases in knowledge and development of fire management systems and on fire effects.
FOREST INSECT AND DISEASE RESEARCH	Maintain current output of impact assessment techniques and insect and disease management systems.
RENEWABLE RESOURCES ECONOMIC RESEARCH	Development of economic analyses required for maintenance of forest and range resource management programs.
RENEWABLE RESOURCES EVALUATION RESEARCH	Increase intensity and shorten timber inventory and analysis cycles and develop multiresource information to meet broad planning requirements.
SOIL MANAGEMENT RESEARCH	Increased knowledge to provide soil information for multiresource management on selected sites and aquatic systems.

	Base Year 1970	Average Annual Costs										
		1978	1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
COSTS												
RESEARCH-												
Operational ^{1/}		105.8	124.2	126.8	129.4	132.0	134.6	144.9	154.2	160.9	165.2	168.6
Capital Investments ^{2/}		2.7	22.0	17.2	12.5	7.7	2.9	3.7	1.2	0.9	1.8	2.7
Total Research		108.5	146.2	144.0	141.9	139.7	137.5	148.6	155.4	161.8	167.0	171.3

^{1/} Research program costs only. YCC, YACC, and other Human Research Programs are included with NFS.

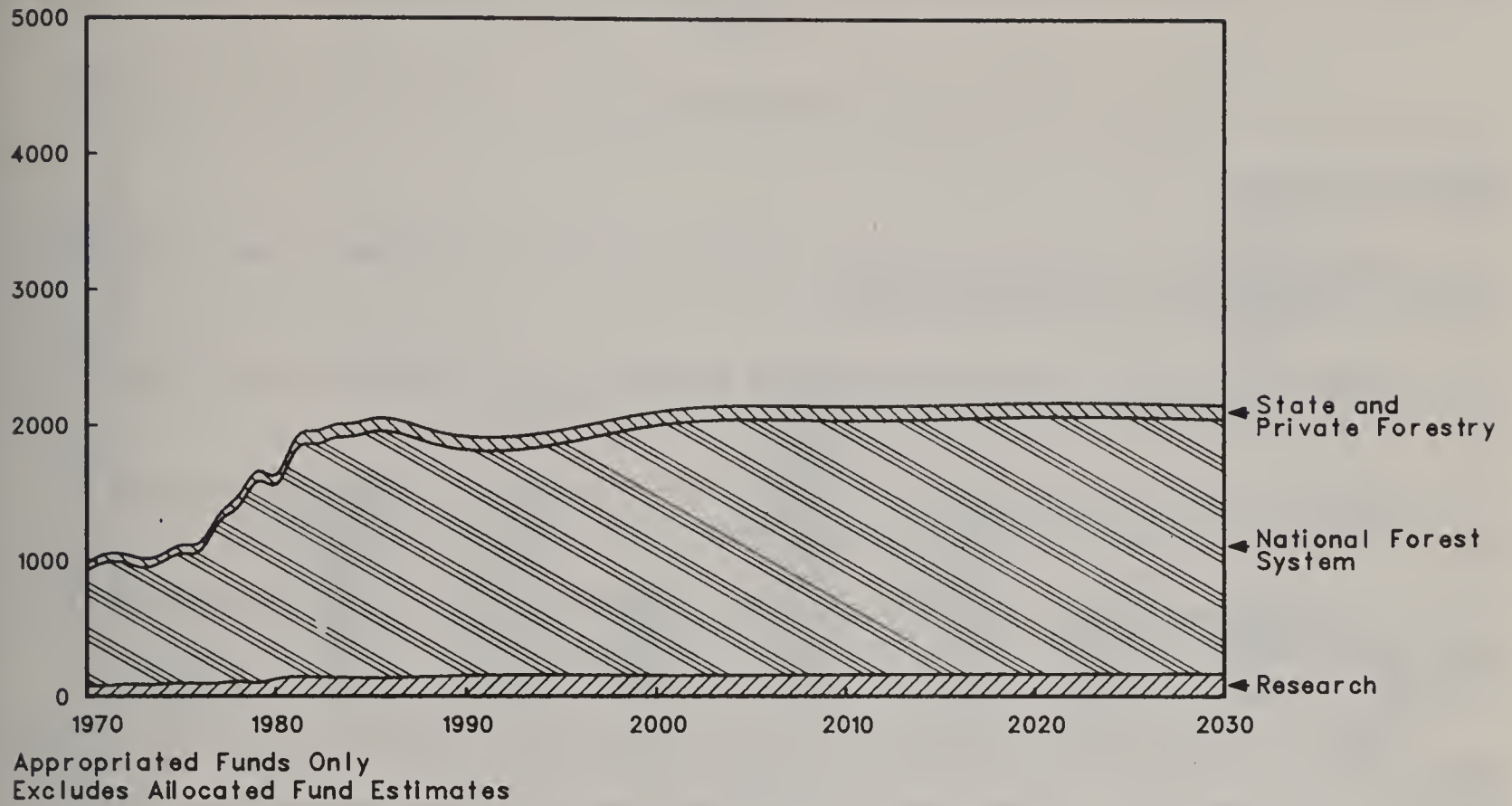
^{2/} Research construction.

^{3/} All costs are in 1978 dollars.

Figure 3.133

Program Cost-Alternative 5

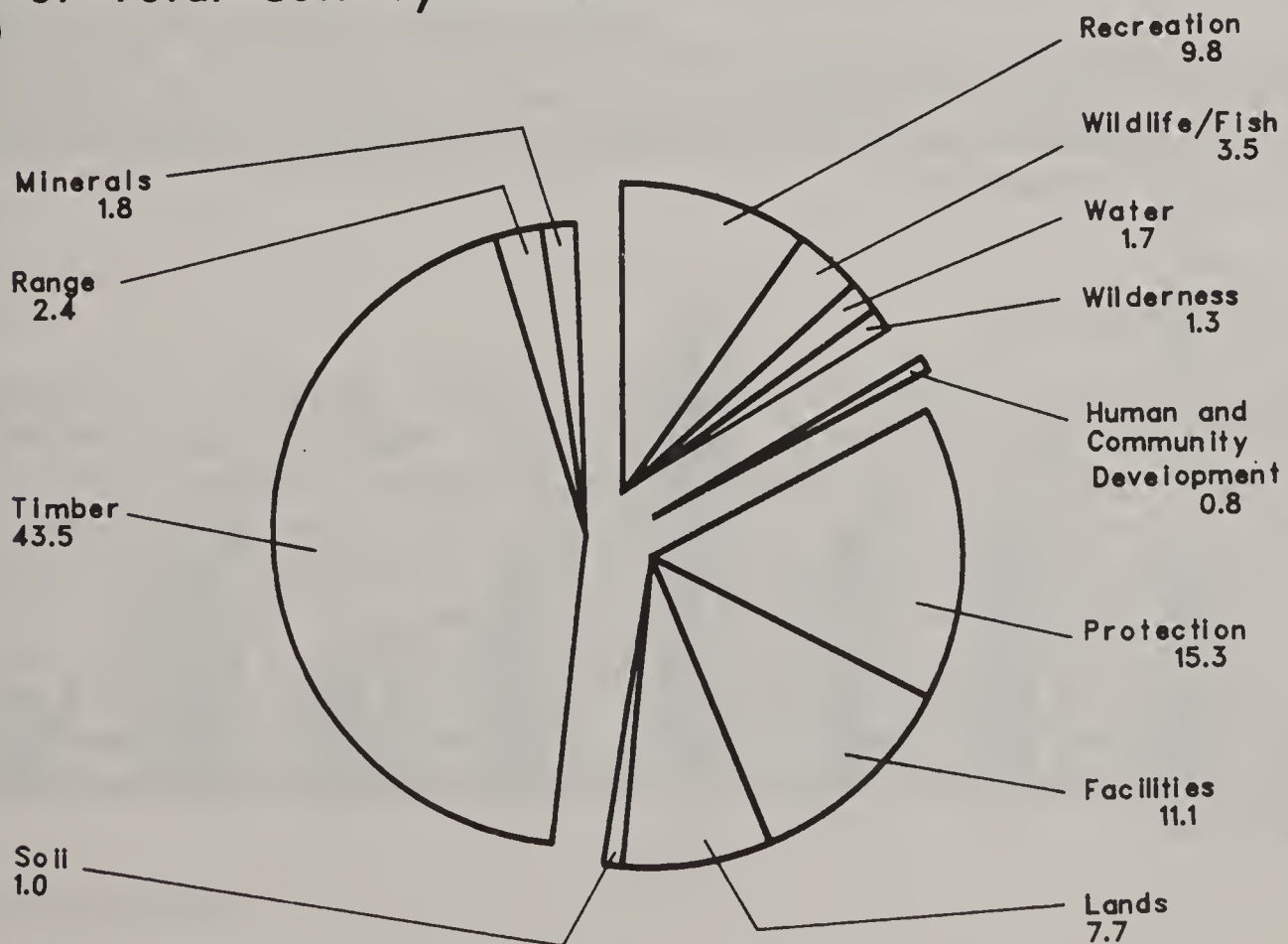
Million Dollars



Alternative 5

Percent of Total Cost by Element

1991 - 2000



THE DETAILS

This section contains additional narrative and graphic material on goals, outputs, and activities for each element in Alternative 5. The last part of the section summarizes environmental effects of the Alternative.

Recreation

National Goals

General, NFS.--Provide for the current relative national share of use and outdoor recreational opportunities.

Developed sites, NFS.--Develop and maintain high quality, low-investment facilities, emphasizing accessibility to urban areas.

Dispersed recreation, NFS.--Provide for increased dispersed recreation use where minimum administration and protection can be provided.

Private investment, NFS.--Encourage expansion of private investment for development of facilities and services on NFS lands.

Visitor Interpretive Service (VIS), visual and cultural resource management, NFS.--Provide interpretive and orientation services at major visitor centers, and provide a low level of orientation services elsewhere. Protect visual and cultural resource values.

Cooperation with others, S&PF.--Participate in cooperative planning and provide technical assistance in support of outdoor recreation upon request for multipurpose forest management assistance on other public and private lands. Private owners desiring technical assistance for income-producing projects would be referred to the Soil Conservation Service or to consultants.

Forest recreation research.--Conduct partial effort to increase development and use of scientific knowledge to assess and predict recreation demand and supply and improve methods for planning, protecting, and managing recreation and visual resources.

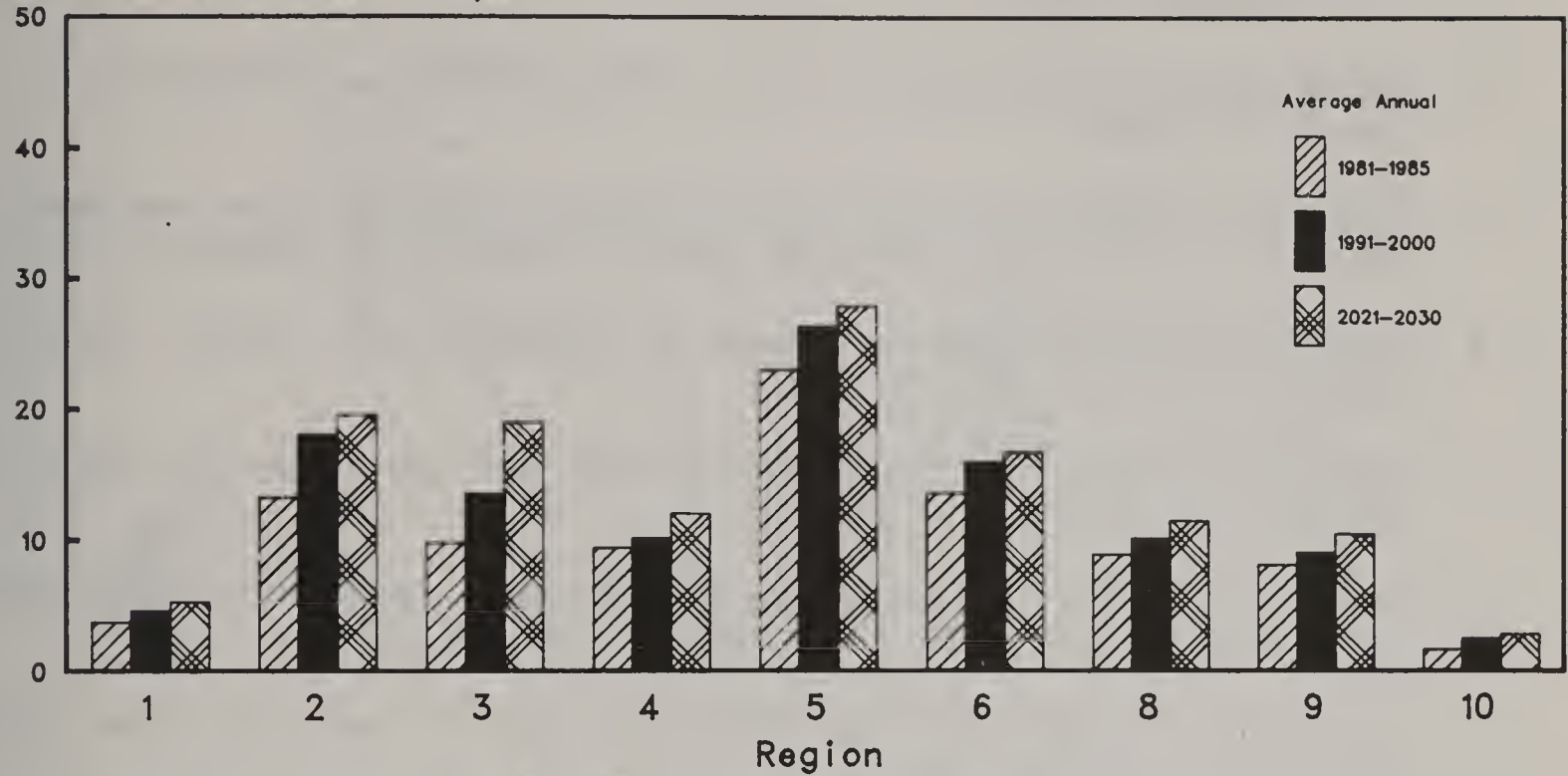
Outputs and Activities

National Forest System.--Provide for a small increase in recreational opportunities on National Forest System lands. Most of the increase would occur in those activities considered market related, such as downhill skiing. Developed site use would reach 125 million visitor days by 2025 from the present 80 million visitor days (table 3.17). Dispersed use (excluding wilderness) would increase at a slower rate and reach 183 million visitor days by 2025 from 130 million visitor days at the present. Figures 3.134 and 3.135 show that the largest increases in developed site use would occur in the western Regions. Cultural resource interpretation and enhancement would be increased in directions compatible with developed outdoor recreational opportunities.

Figure 3.134

Regional Estimates-Alternative 5 Developed Recreation Use (NFS)

Million Recreation Visitor Days

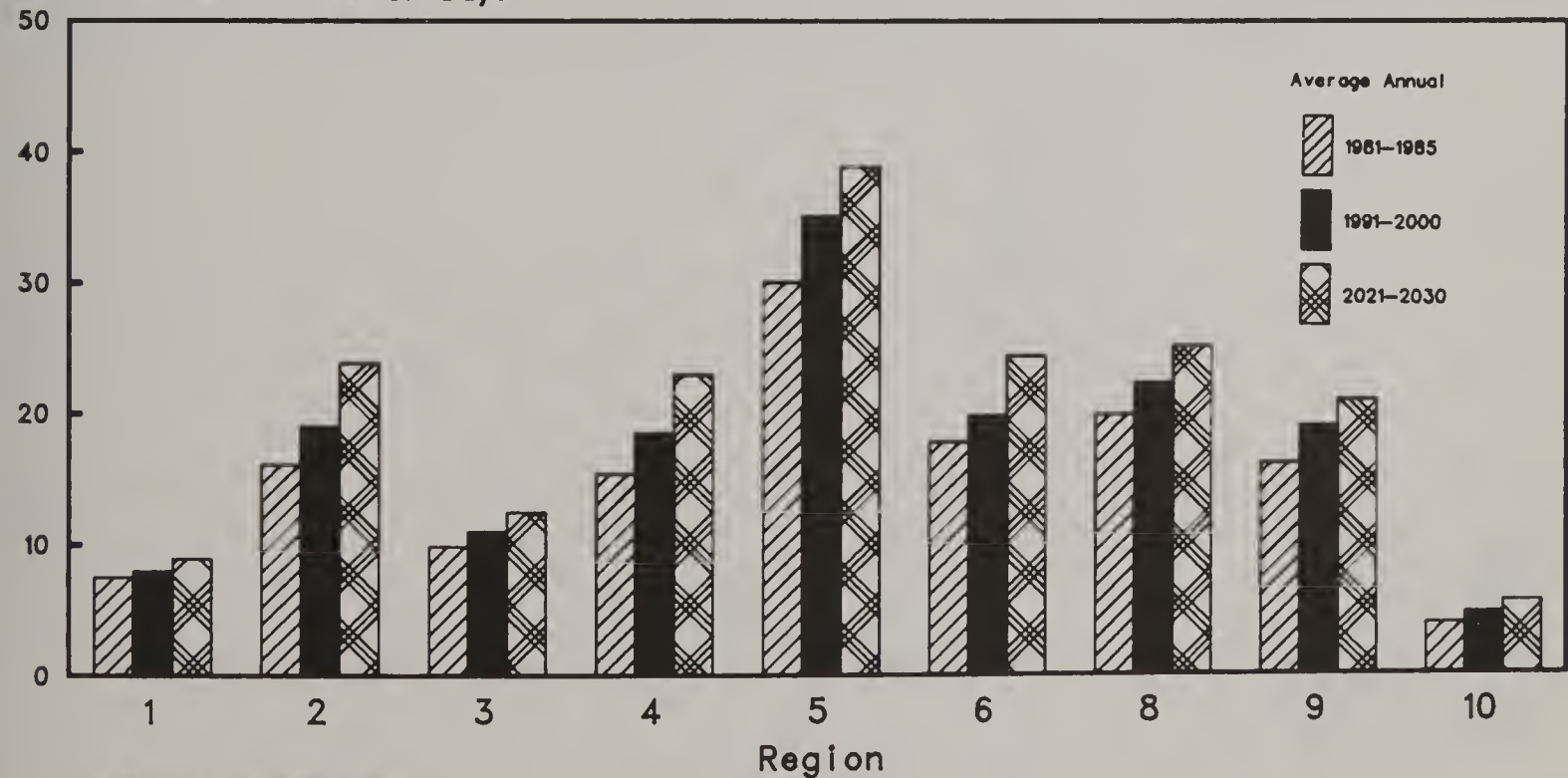


Includes Visitor Information Services

Figure 3.135

Regional Estimates-Alternative 5 Dispersed Recreation Use (NFS)

Million Recreation Visitor Days



Excludes Wilderness Use

Highlights of this Alternative would:

- Encourage the private sector to develop commercially oriented recreational developments on the National Forests with risk capital.
- Increase the number of fee sites and level of fees charged on National Forest System lands.
- Use existing technology to assist with planning and management of visual resources.
- Emphasize interpretive and orientation services at sites and areas associated with commercially oriented recreational opportunities.
- Close sites where resource damage is occurring until action could be taken to eliminate damage.
- Provide full service at all charge sites and the dispersed areas requiring minimum administration.
- Maintain trails to minimize resource damage. Some trail construction and reconstruction would take place (figure 3.136).
- Carry out cultural resource compliance work to conform to the level of activities in other areas.

State and Private Forestry.--Planning and technical assistance for dispersed recreation and esthetic improvement would be included in multiresource forest management plans for private landowners who wish to take advantage of these opportunities (figure 3.137).

Research.--New knowledge would be produced on current use and users, benefits, cost, and future demands. New technology would improve procedures to manage esthetics and visual quality and to integrate recreation with other resource uses.

Figure 3.136

Regional Estimates-Alternative 5 Trail Construction-Reconstruction (NFS)

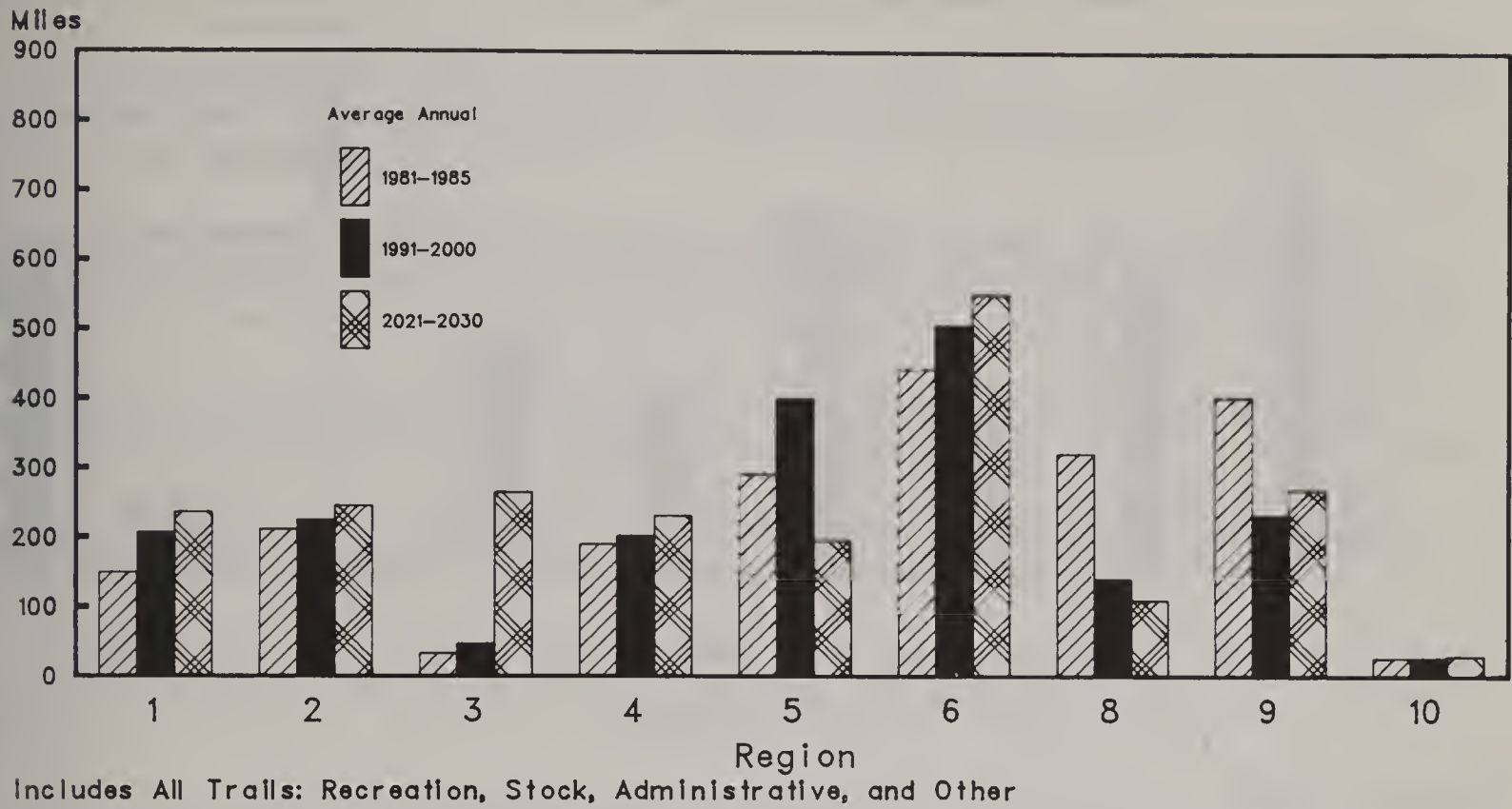
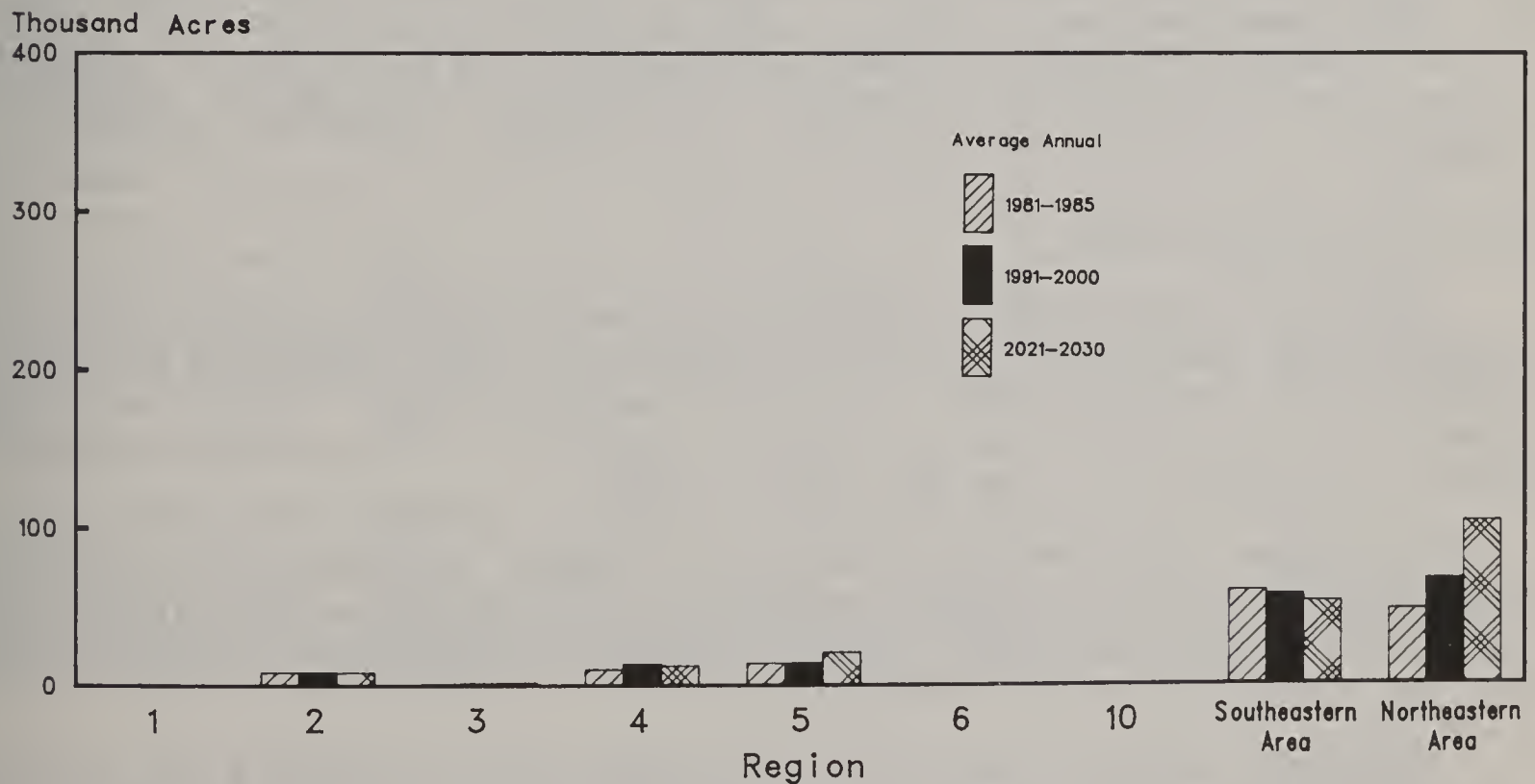


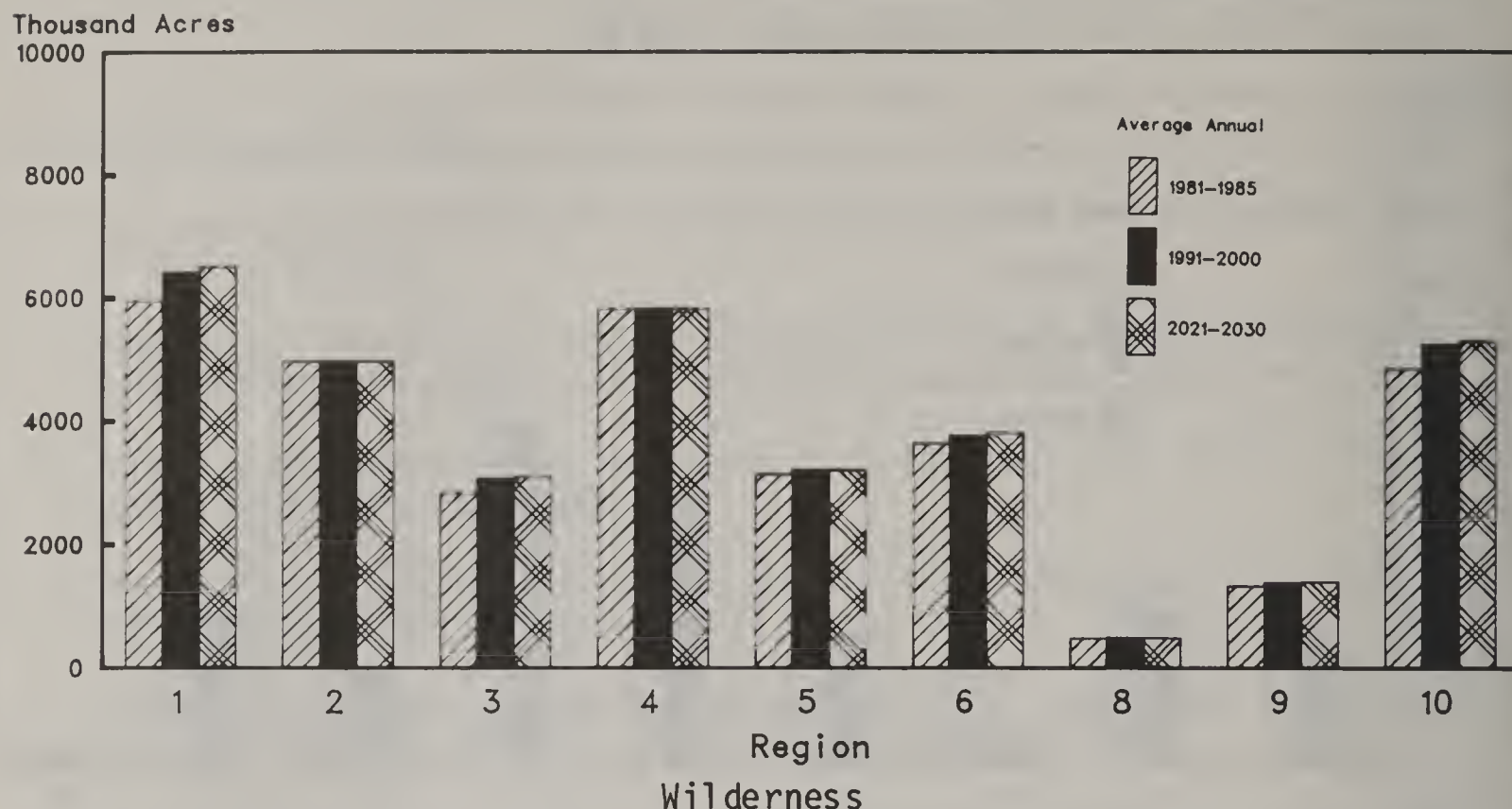
Figure 3.137

Regional Estimates-Alternative 5 Technical Assistance for Dispersed Recreation (S&PF)



Regional Estimates-Alternative 5

Wilderness Management (NFS)



National Goals

Wilderness designation, NFS.--Recommend moderate increases in number of wildernesses. Designate areas of wilderness that contain a wide range of values for primitive recreation and solitude and high values for natural integrity and naturalness.

Wilderness management, NFS.--Provide for a moderate increase in wilderness use, protection of wilderness values, and reduction of conflict. Maintain a very wide range of conditions for primitive recreation and solitude and very high value conditions for natural integrity and naturalness.

Wilderness research.--Conduct moderate effort to increase development and use of scientific knowledge regarding management and protection of primitive recreational opportunities, solitude, and ecological features of extreme values.

Outputs and Activities

National Forest System.--Alternative 5 would increase by 1985 acreage of wilderness by about 20 million acres (middle of range) beyond the existing wilderness and those proposed, endorsed, and under study. The NFS would include nearly 35 million acres by 2025 as depicted in the projected national outputs in table 3.17. See also figure 3.138.

Management in Alternative 5 would be slightly expanded beyond that of Alternative 3 to meet a moderate increase in use of designated wildernesses. This would permit a slightly greater intensity of management application but not the level afforded by Alternative 4.

Research.--Research would not only produce ways to measure use, explain characteristics of users, and solve sanitation problems but would also determine how to maintain isolation from sights, sounds, and presence of others.

National Goals

Endangered and threatened species, NFS.--Manage habitat for species (plants and animals) on Federal and State lists to protect and maintain populations, and enhance in conformance with recovery plans.

Habitat diversity, NFS.--Provide habitat diversity, well distributed on each National Forest, to maintain viable populations of all vertebrate and selected invertebrate species.

Enjoyment of wildlife and fish in developed areas, NFS.--Develop opportunities for appreciative (nonconsumptive) enjoyment of wildlife and fish at 60 percent of developed recreation and VIS sites.

Anadromous and resident fish, NFS.--Manage anadromous and resident fish habitat capability at 70 percent of potential.

Population levels, NFS.--Manage habitat for economically and esthetically important species to provide low to moderate population levels.

Cooperation with others, S&PF.--Maintain existing cooperative technical assistance programs in areas where wildlife imbalances or special problems exist.

Wildlife, fish, and plant habitat research.--Develop and use more scientific knowledge about selected game and threatened and endangered species and their habitats, and develop methods to apply current information about game and nongame species of fish and wildlife.

Outputs and Activities

National Forest System.--Wildlife habitat improvements would increase slightly from 2.3 million acre equivalents in 1978 to 2.4 million in 1985, and fall to 1.1 million in 2025 as maintenance largely offset the need for new improvements, except for replacement. Anadromous fish habitat improvements would increase the annual contribution of the National Forests to the commercial salmon fishery by 2.2 million pounds in 1985 and 13.9 million pounds in 2005 through 2025 (figure 3.140). Maintenance of both wildlife and fish habitat improvements would increase throughout the period. Market outputs would cause species dependent on special habitats--dead trees, old growth, dense riparian vegetation--to be at low-to-moderate, yet viable, population levels. Wildlife favored by other successional stages would be only slightly higher.

The high-level program in Region 8, relative to the other Regions as displayed by figure 3.139, is because of habitat improvements possible from prescribed burning. Region 10 has a very small habitat improvement program. For anadromous fish, Region 10 has most of the program potential, Regions 2, 3, and 8 have none, and Region 9 has very little (figure 3.140).

Figure 3.139

Regional Estimates-Alternative 5 Wildlife Habitat Improvement (NFS)

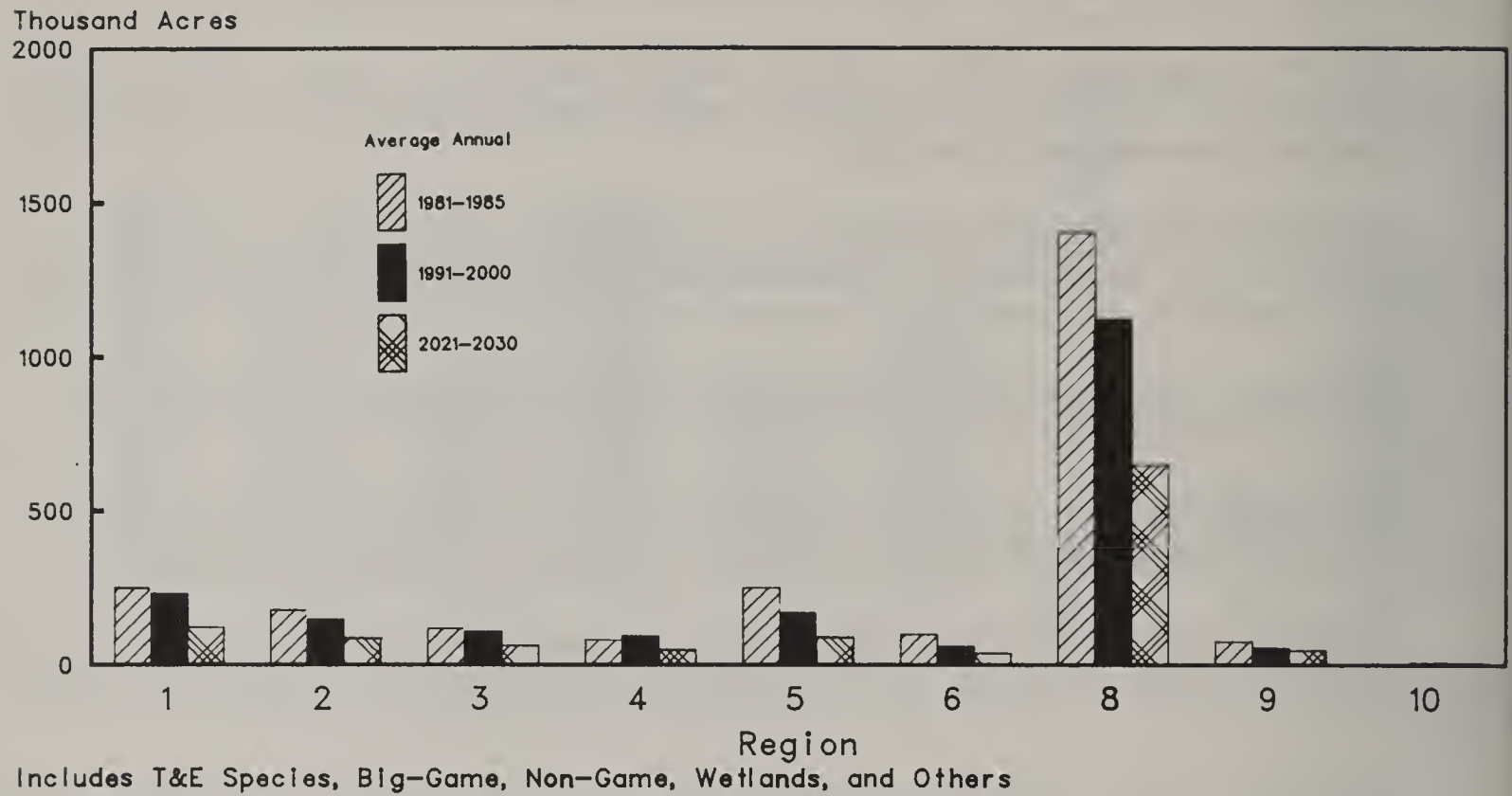
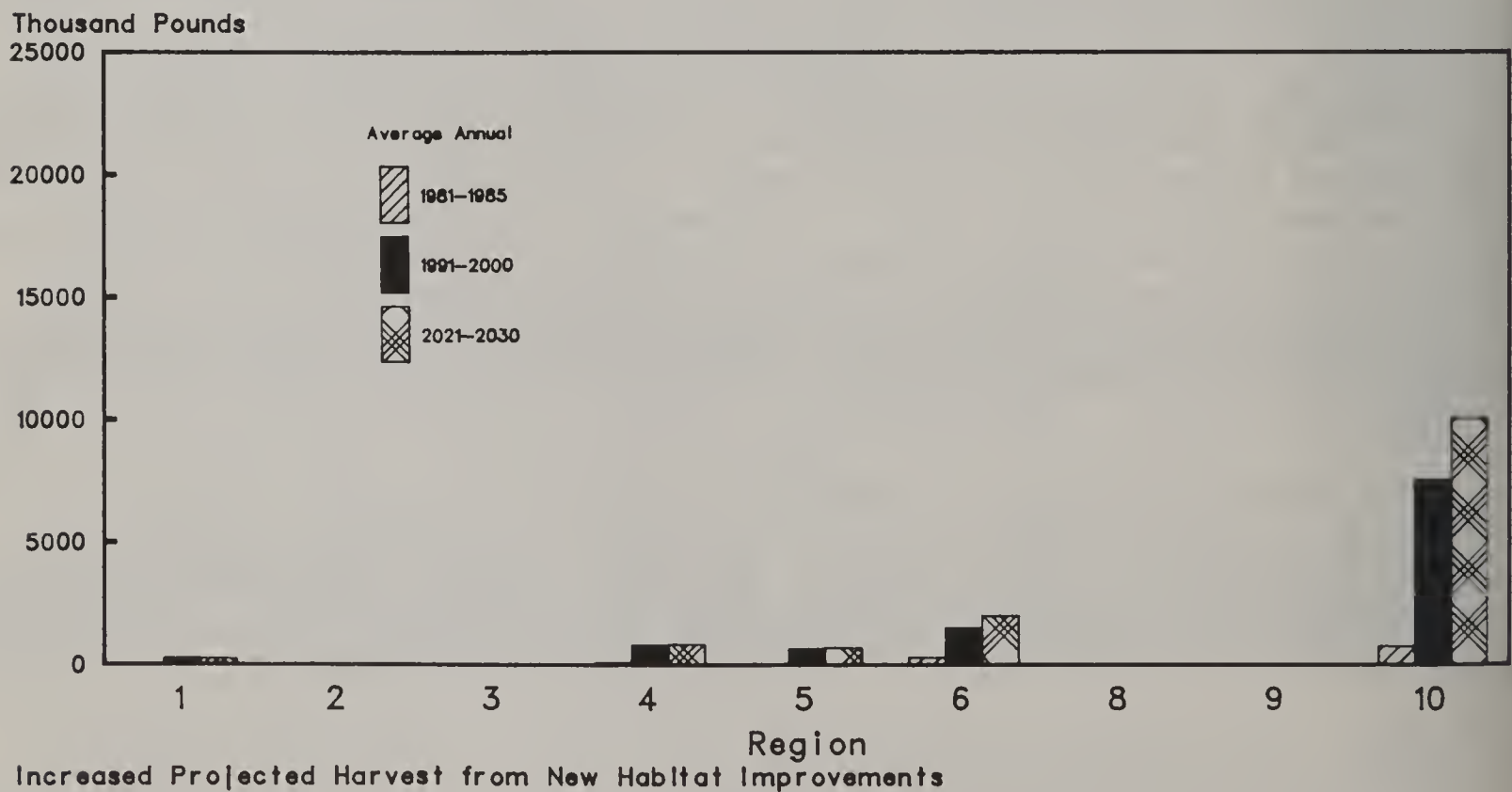


Figure 3.140

Regional Estimates-Alternative 5 Anadromous Fish (NFS)



It is anticipated that population levels of certain management indicator species would respond by 1995 as follows:

Management Indicator Species Index (Current Situation = 100)

<u>Species</u>	<u>Alternative 5</u>
Mule deer	110
White-tailed deer	110
Black-tailed deer	110
Elk	105
Wild turkey	100
Cavity nesting birds	100
Resident trout	100
Anadromous fish	90

Alternative 5 continues the current situation of a slowly increasing program.

State and Private Forestry.--Technical and related assistance for wildlife and fish habitat improvement would be continued at approximately the current program level on private and non-Federal public lands. Emphasis would be given to special problems of landowners who wish to include wildlife habitat improvement as a significant objective in their multiresource forest management plans. Expected regional variations in acres on which assistance would be provided are illustrated in figure 3.141.

Research.--Additional knowledge would be produced to enhance the land manager's ability to deal with current consumption and nonconsumptive use and users, future demands, costs, and benefits. New technology would improve the overall process for managing threatened and endangered species, selected game and nongame species, and their habitats.

Range

National Goals

Range management, NFS.--Provide forage to support grazing at 10 percent above the current number of permitted livestock by 2025 and treat rangeland in unsatisfactory condition to eliminate environmental damage and maintain productivity.

Cooperation with others on non-Federal forested ranges, S&PF.--Maintain existing cooperation and technical assistance on non-Federal forested ranges in cooperation with other agencies.

Range Research.--Continue to develop and use scientific knowledge to increase livestock production.

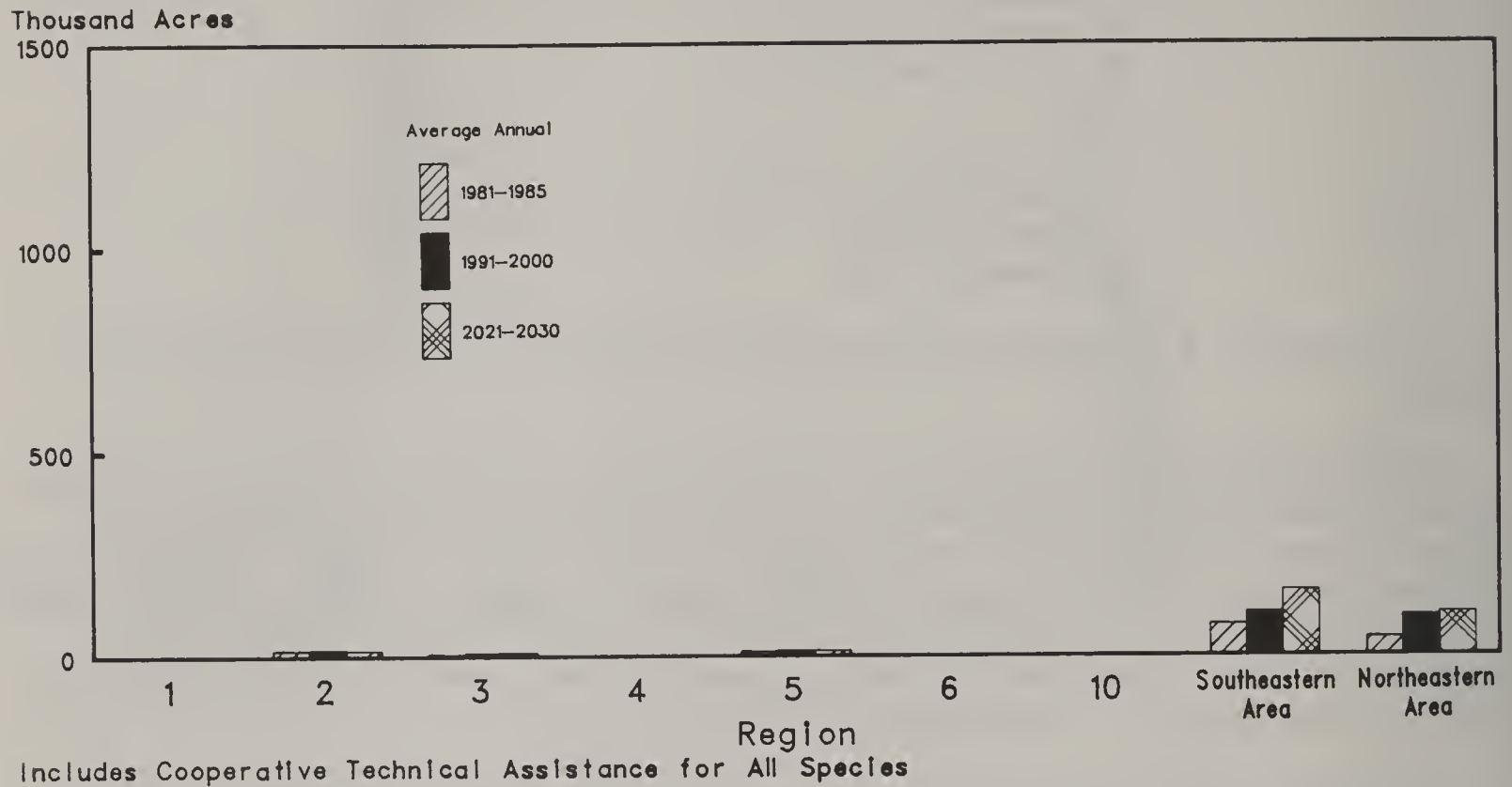
Outputs and Activities

National Forest System.--Livestock grazing use on the National Forest System would increase from the present 9.9 million animal-unit-months to approximately 10.8 million animal-unit-months in 2025. Best opportunities for cost-effective grazing would be implemented under this program. Some

Figure 3.141

Regional Estimates-Alternative 5

Technical Assistance for Wildlife Habitat Improvement (S&PF)



intensification of grazing would occur on the most productive areas. Under Alternative 5, it is anticipated that the area grazed in the National Forest System would decline from 103 million acres to approximately 90 million acres by the year 2025. It is expected that ecological conditions of rangelands would be improved where cost-effective opportunities exist. Returns to the U.S. Government would increase slightly. The unit costs of the range program are anticipated to remain nearly constant. Capital investments would continue to be made using the Range Betterment Fund authority contained in the Federal Land Policy and Management Act of 1976. Evaluation and testing on the three projects presently underway would continue under Alternative 5. It is anticipated that only slight grazing use increases would occur on National Forests in the Eastern United States (figure 3.142).

State and Private Forestry.--Technical and related assistance for forage production on non-Federal forested ranges would be closely coordinated with other responsible agencies, and assistance would be largely in the form of describing range opportunities in multiresource forest management plans (figure 3.143).

Research.--New information would result from this research to improve environmentally acceptable methods of livestock production. Strategies would be produced whereby the land manager could use scientific knowledge to better utilize and protect the rangeland resources, especially the high value commodities.

Figure 3.142

Regional Estimates-Alternative 5 Grazing Use (NFS)

Thousand Animal Unit Months

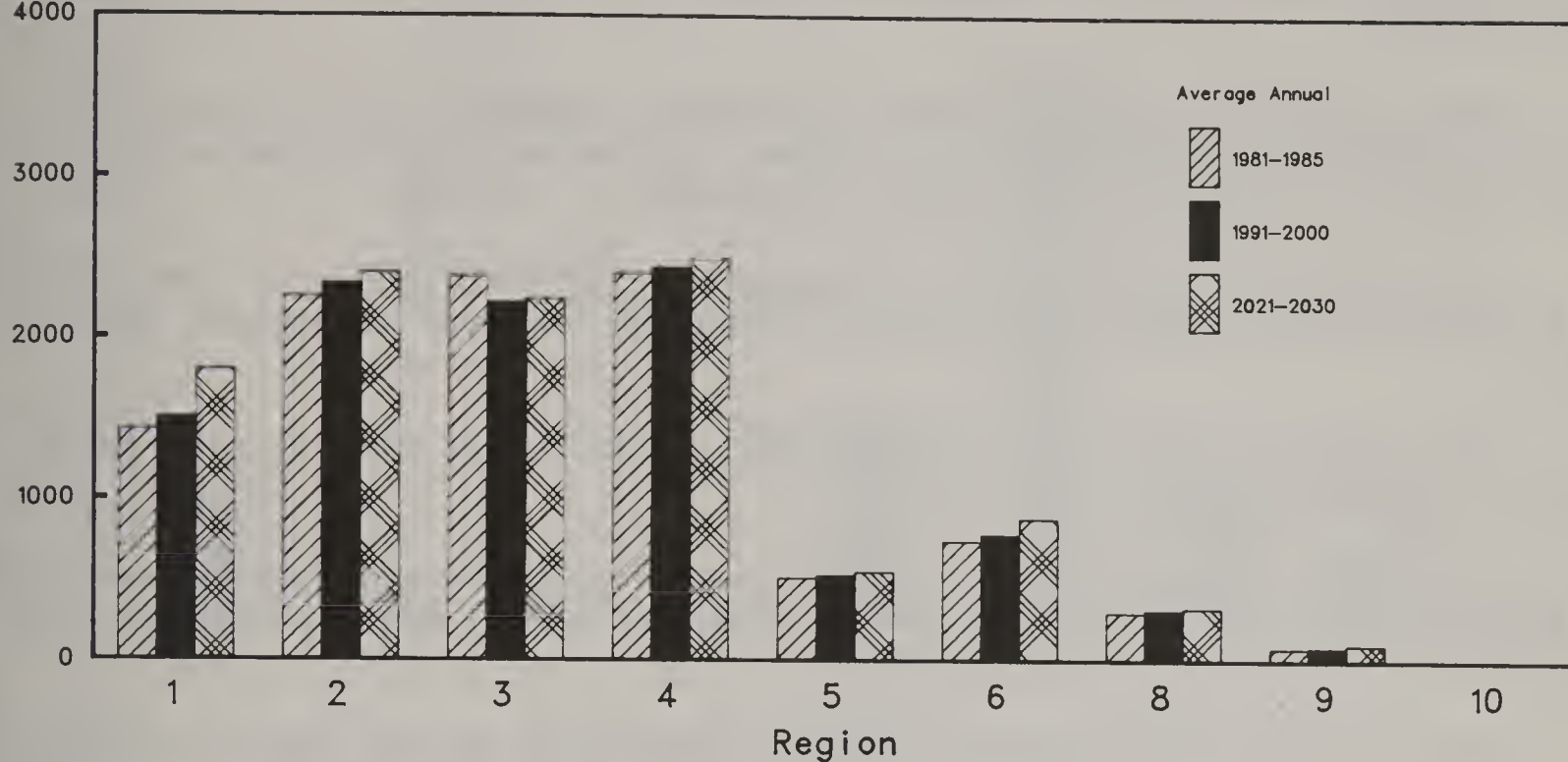
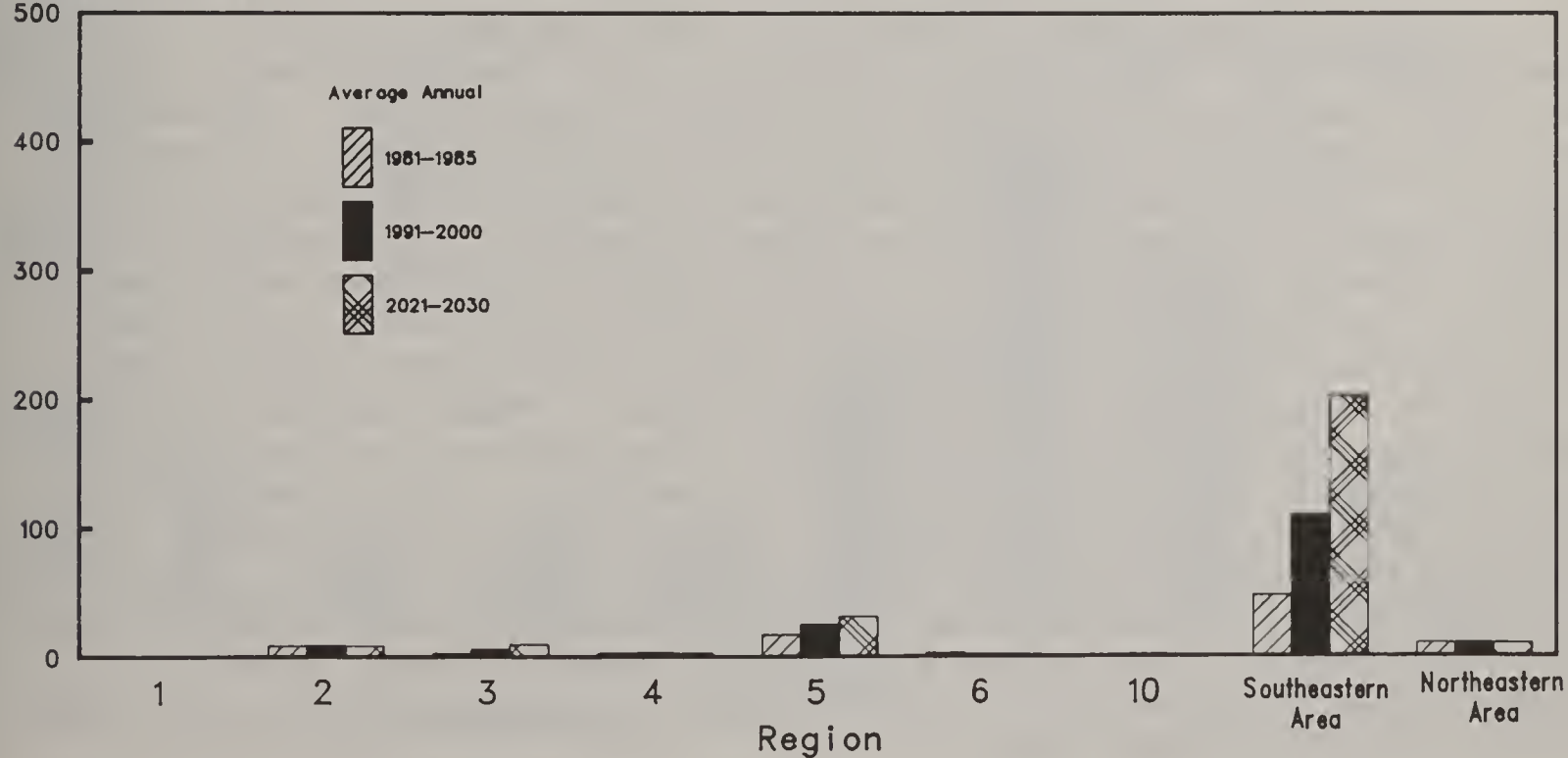


Figure 3.143

Regional Estimates-Alternative 5 Technical Assistance for Range Improvement (S&PF)

Thousand Acres



National Goals

Timber supply, NFS.--Sustain current levels of timber supply.

Silvicultural practices, NFS.--Maintain current-level applications of silvicultural practices on commercial forest land with emphasis on sawtimber and fuelwood.

Wood utilization, NFS.--Support continuing programs to efficiently use expanding amounts of available wood fiber from harvested and treated areas with emphasis on chemical and energy conversion.

Cooperation in private forest management, S&PF.--Continue current efforts to expand private timber supply and to encourage improved management practices.

Cooperation in wood utilization, S&PF.--Continue current efforts to encourage increased use of wood fiber.

Timber management research.--Maintain current basic and applied research to support intensive culture on better sites and reduce research emphasis on integration of extensive management.

Forest products utilization research.--Maintain current research efforts to ensure maximum utilization from each harvested tree and continue emphasis on removal and utilization of dead and dying trees and other residues as a means of improving the forest land environment.

Forest engineering research.--Concentrate research efforts toward the engineering and economic aspects of removal and utilization of dead and dying trees and other forest residues and toward improving the forest land environment.

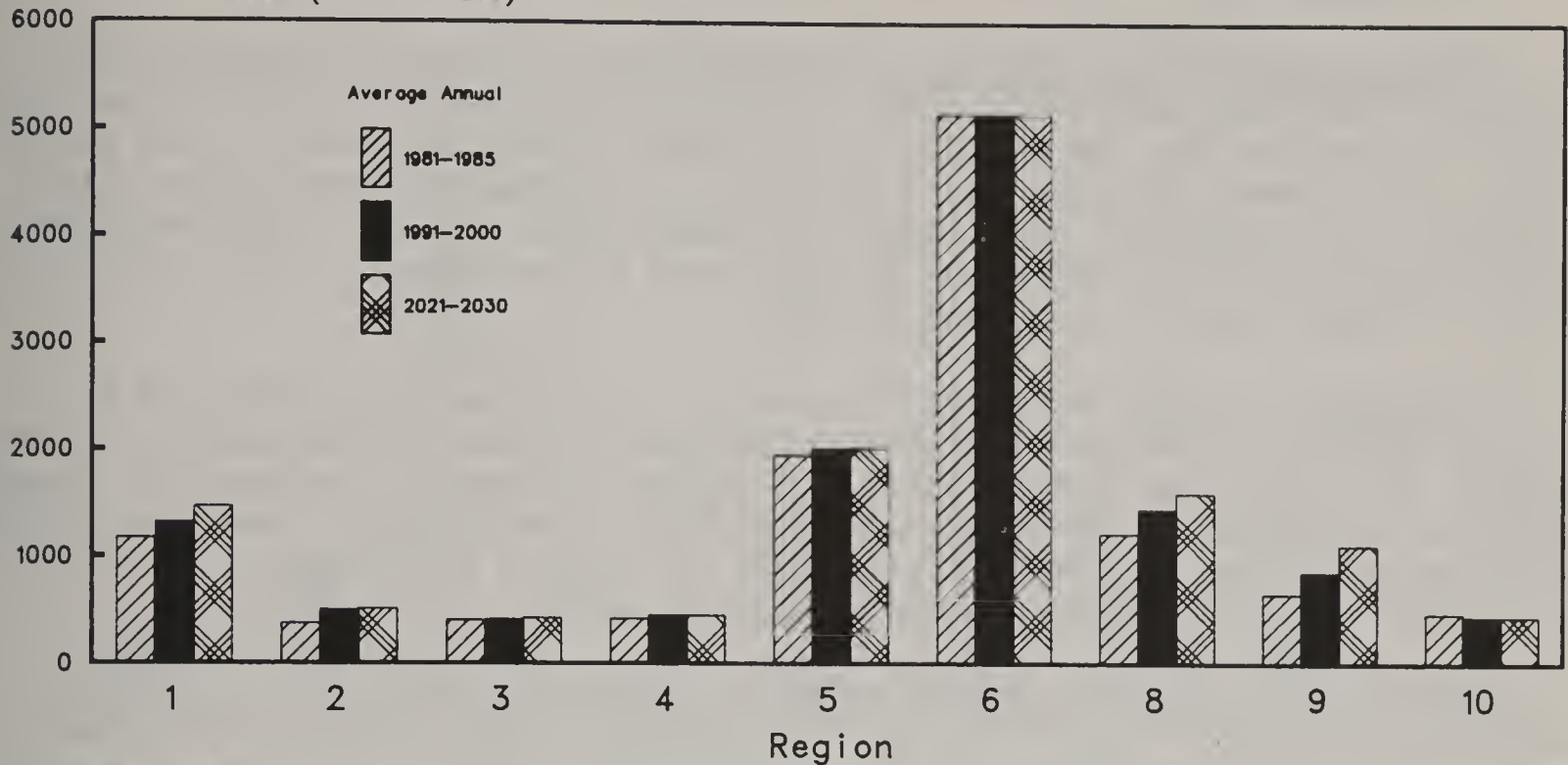
Outputs and Activities

National Forest System.--Timber sale offerings would increase from 12.2 billion board feet local scale in 1978 to 13.2 billion board feet in 2025 with the slight increase due to better utilization (figure 3.144). Harvesting would be maintained at the present rate with special emphasis on mortality harvests. Regeneration harvests would be shifted to primarily overmature timber stands to increase effective long-term growth. Intermediate harvests in young stands would be used to control stocking and produce additional volumes. Desired age class structure and distribution would be achieved over several rotations. Reforestation would increase from 372,000 acres in 1988 to 420,000 acres in 2025 (figure 3.145). Prompt reforestation with genetically improved growing stock on all regeneration-harvested lands and catastrophically deforested lands would be required. Fertilizer would be applied to stands where the response is known to be cost effective. Timber stand improvement would decrease in most Regions (figure 3.146). The use of wood fiber would be increased for chemical and energy conservation from harvested and treated areas within the National Forest System. A total of 434,000 acres of reforestation backlog would be regenerated and would sustain current levels of timber supply.

Figure 3.144

Regional Estimates-Alternative 5 Programmed Sales Offered (NFS)

Million Board Feet (Local Scale)

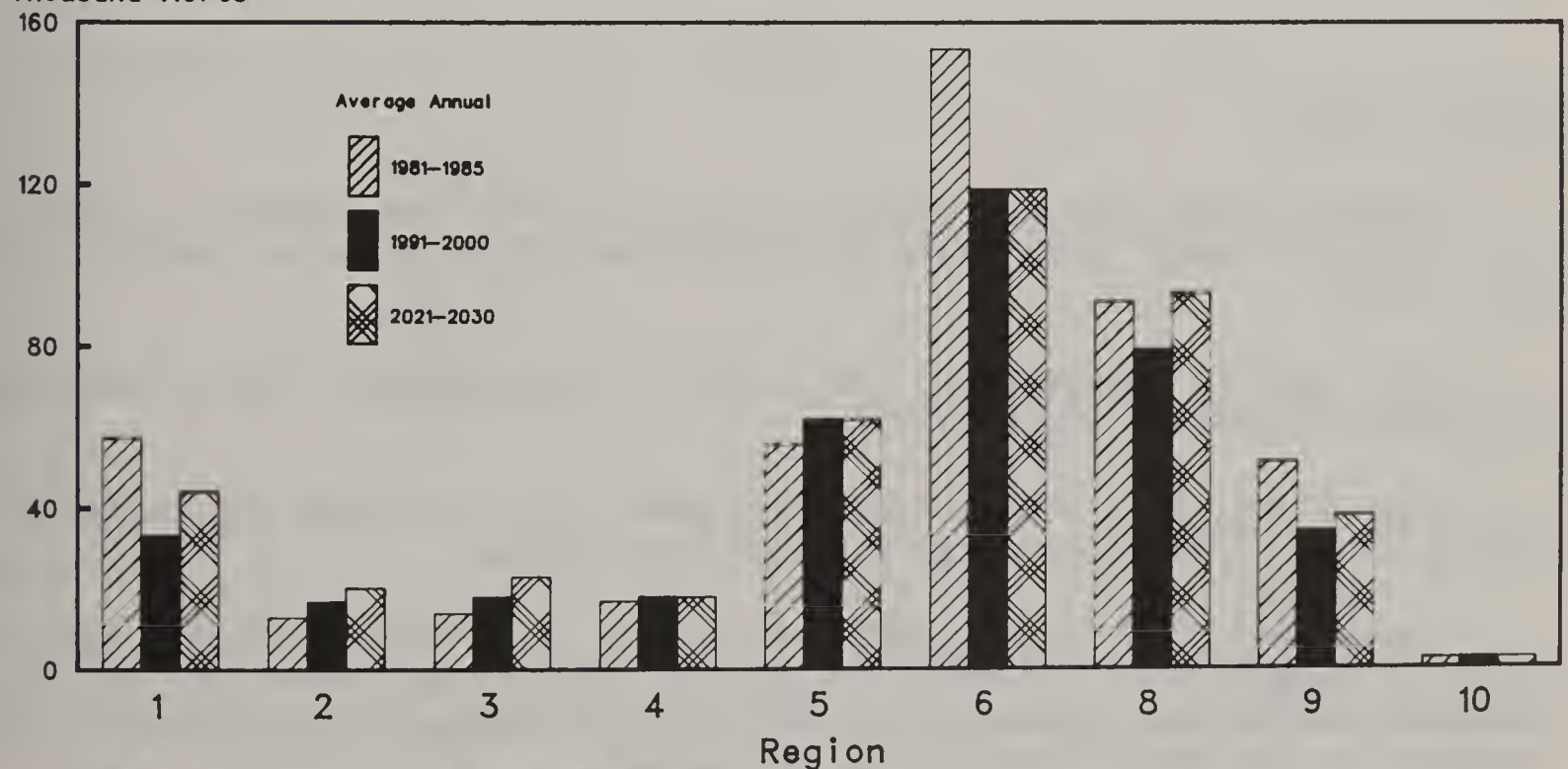


Includes Live and Mortality; Hardwood and Softwood

Figure 3.145

Regional Estimates-Alternative 5 Reforestation (NFS)

Thousand Acres



Includes KV and Appropriated Funds

For NFS, Alternative 5:

- Would maintain current wood-for-energy efforts in maintaining or slightly increasing harvest residue availability.
- Stumpage price increases would continue as projected in the 1980 Assessment.

State and Private Forestry.--Continuation of current levels of timber harvest within the National Forest System would probably not alter the economic incentives for the production of timber from State and private forest lands. The Forest Service would continue to provide moderately low levels of financial and technical assistance for proper sale, harvest, and processing techniques as well as increased and improved timber growth. (See figures 3.147, 3.148, 3.149, 3.150, and 3.151).

Research.--Timber management research: Increased knowledge and technology would be developed from basic and applied research to support intensive timber culture on the better sites. A modest program of regeneration research would be conducted on harvested and disturbed forest sites. Management guides for most of the major forest types would be updated with current information on technologies for enhancing multiresource values.

Forest products utilization research results on whole tree utilization would be published. Guidelines would be produced for technical assistance to public and private landowners on harvesting and processing dead and dying trees. Research results would be made available on the use of forest residues for new composite wood products and energy, and the benefits of residue removal from forest lands would be documented.

Forest engineering research would provide information to support the economical and technical opportunities for harvesting and utilizing dead and near-dead trees from public lands. Research publications would report the results of cooperative efforts with the National Forest System to investigate the needs and opportunities for improving forest environments.

Water

National Goals

Technical water support services, NFS.--Provide key technical water support services needed to maintain and selectively improve water quality and water yield.

Water quality improvement, NFS.--Selectively implement water resource improvements to enhance water quality.

Water yield, NFS.--Selectively implement water resource improvements to enhance water yield in critically water-short areas.

Cooperation with others, S&PF.--Encourage coordinated planning and implementation of watershed and flood prevention activities through assistance, cooperation, and involvement of private forest landowners and Federal, State, and local organizations responsible for water.

Figure 3.146

Regional Estimates-Alternative 5 Timber Stand Improvement (NFS)

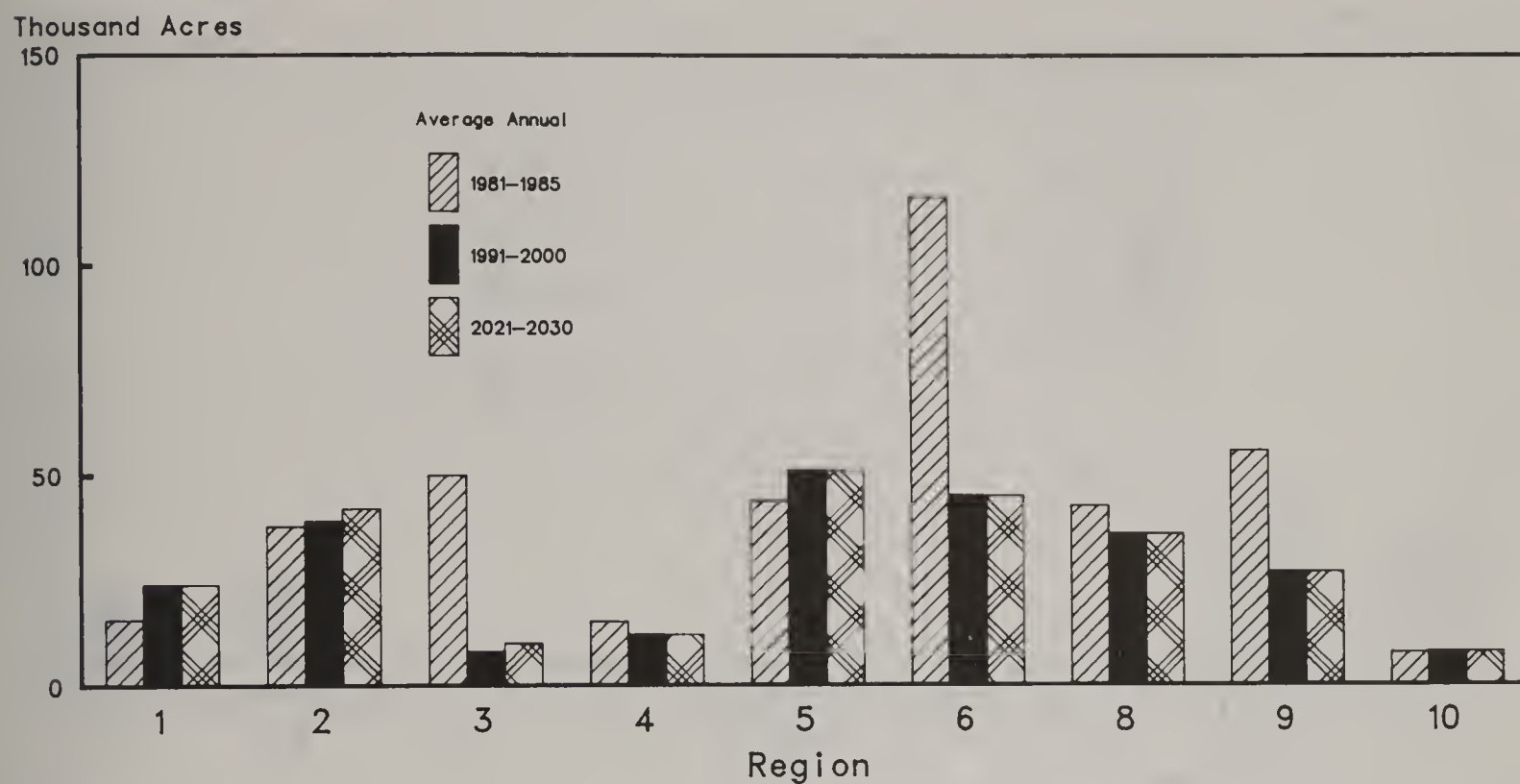
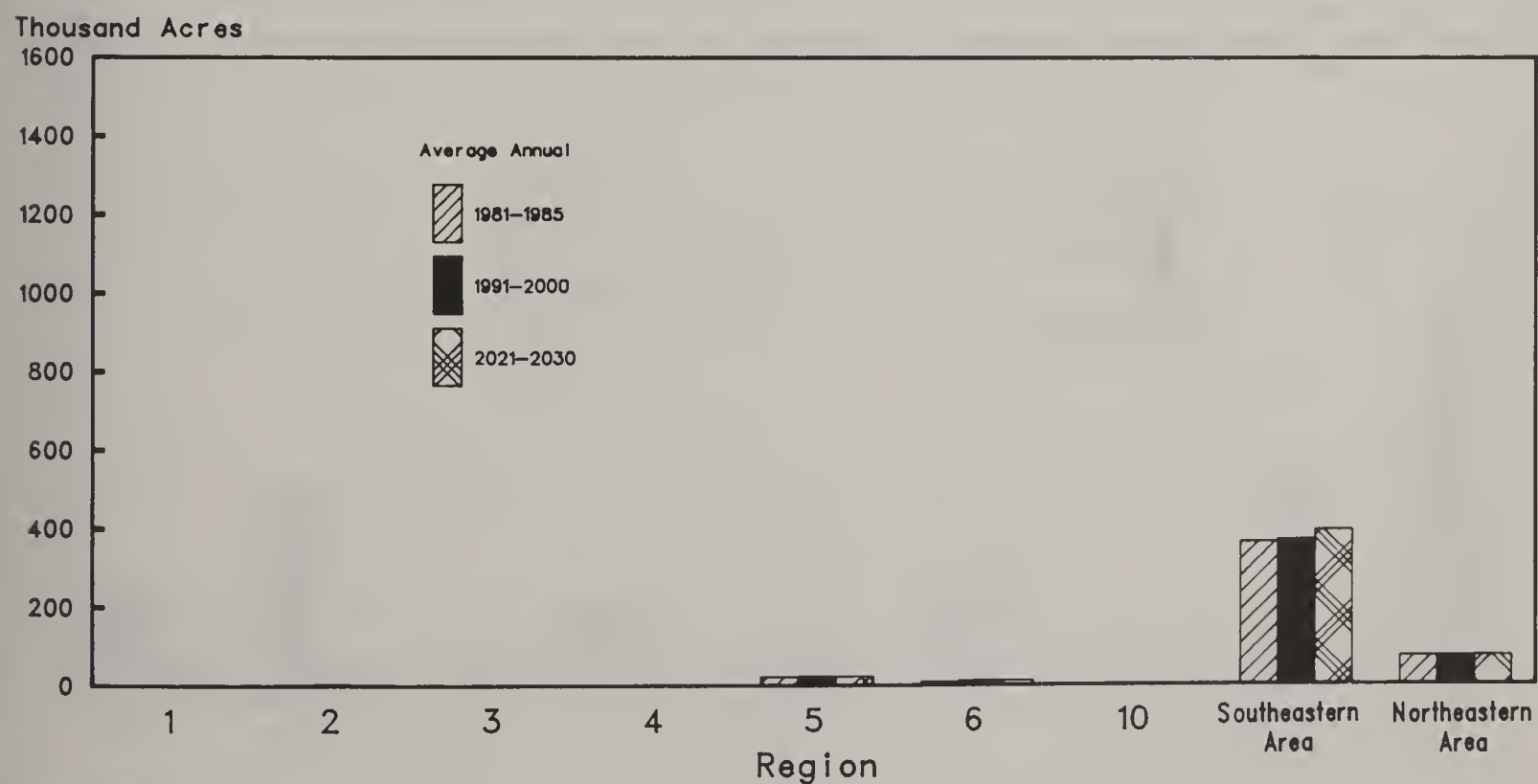


Figure 3.147

Regional Estimates-Alternative 5 Reforestation (S&PF)



Includes RFA, FIP, and ACP

Figure 3.148

Regional Estimates-Alternative 5 Timber Stand Improvement (S&PF)

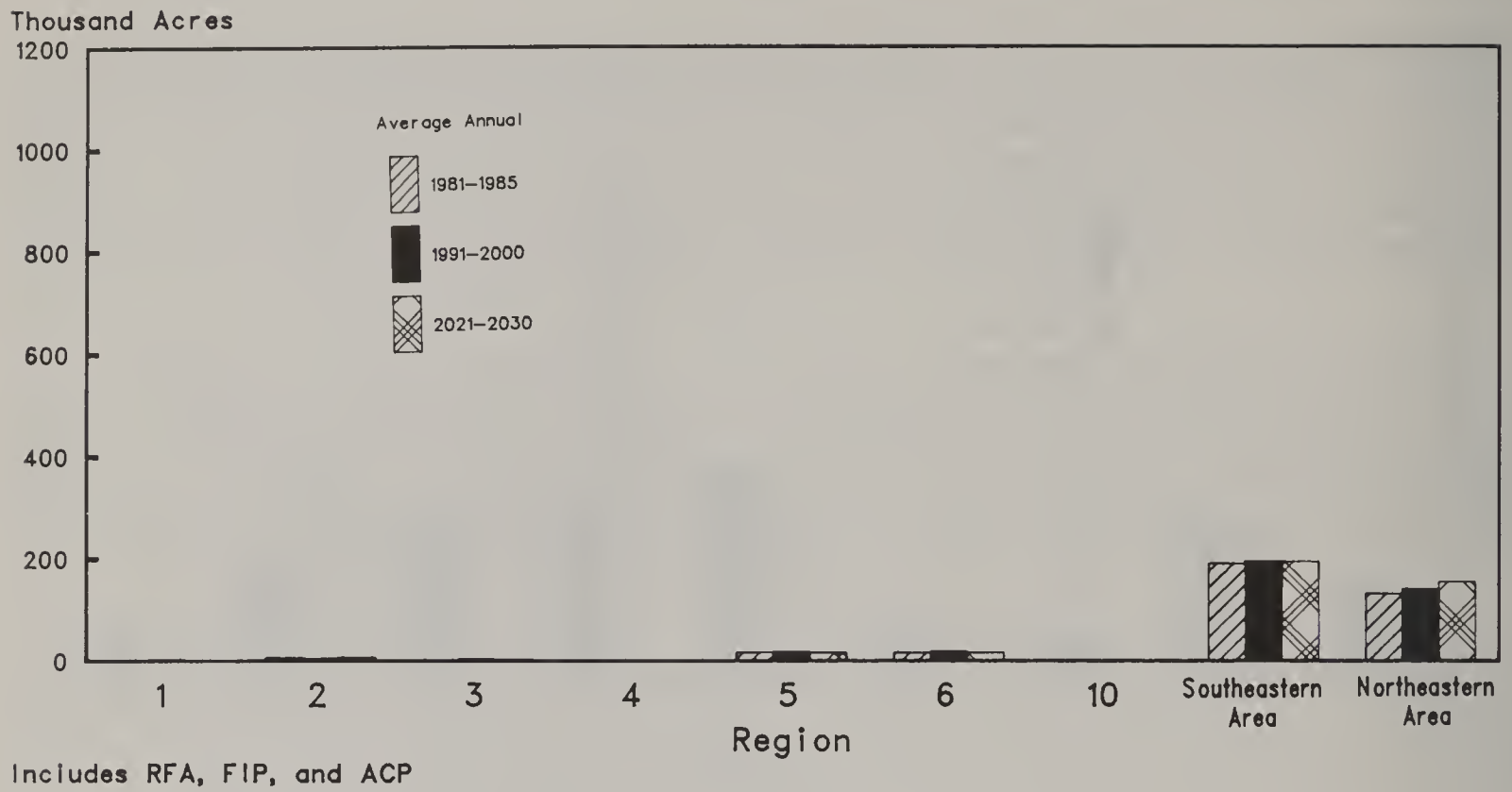


Figure 3.149

Regional Estimates-Alternative 5 Timber Prepared for Harvest (S&PF)

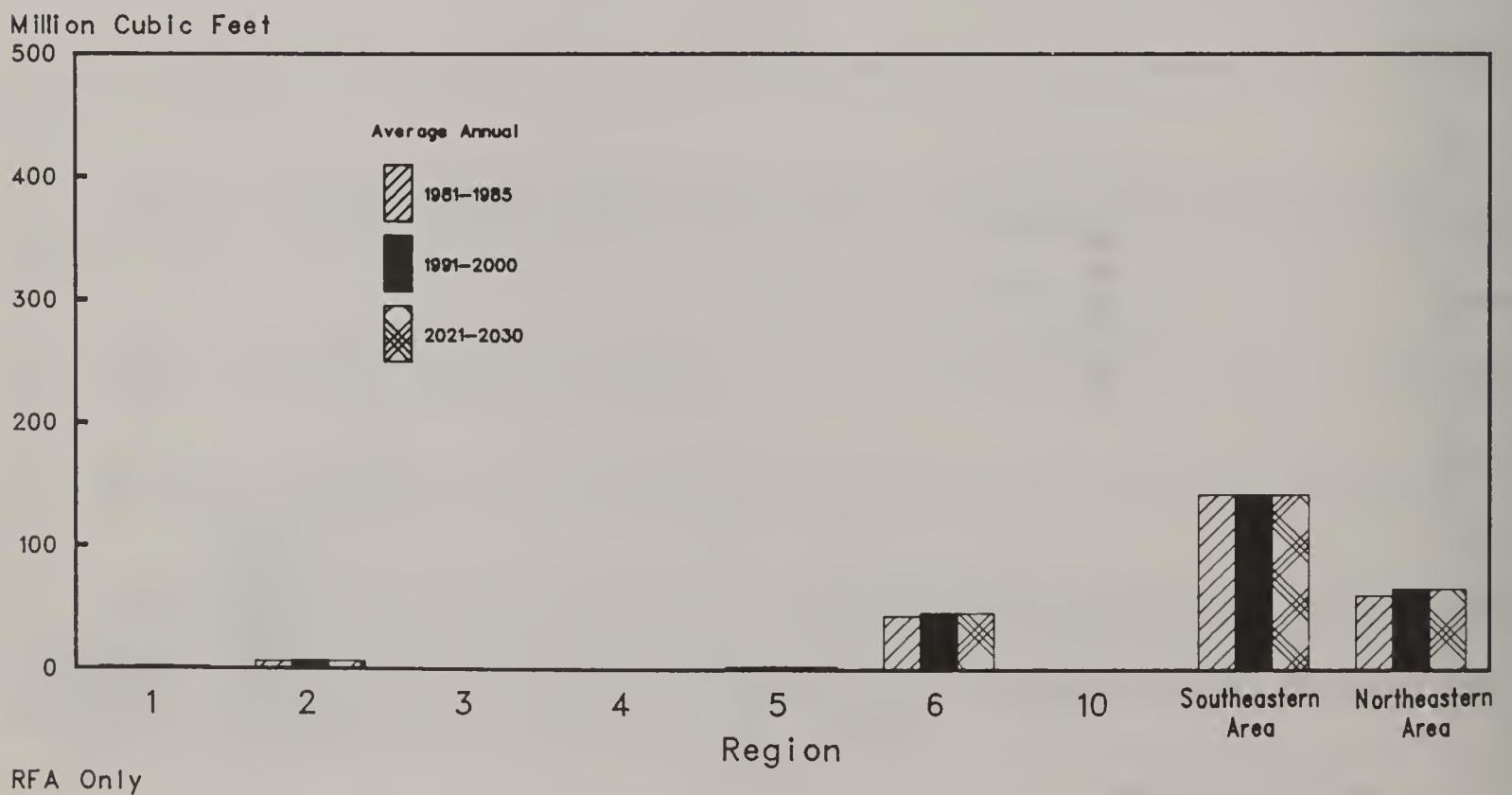


Figure 3.150

Regional Estimates-Alternative 5 Woodland Owners Assisted (S&PF)

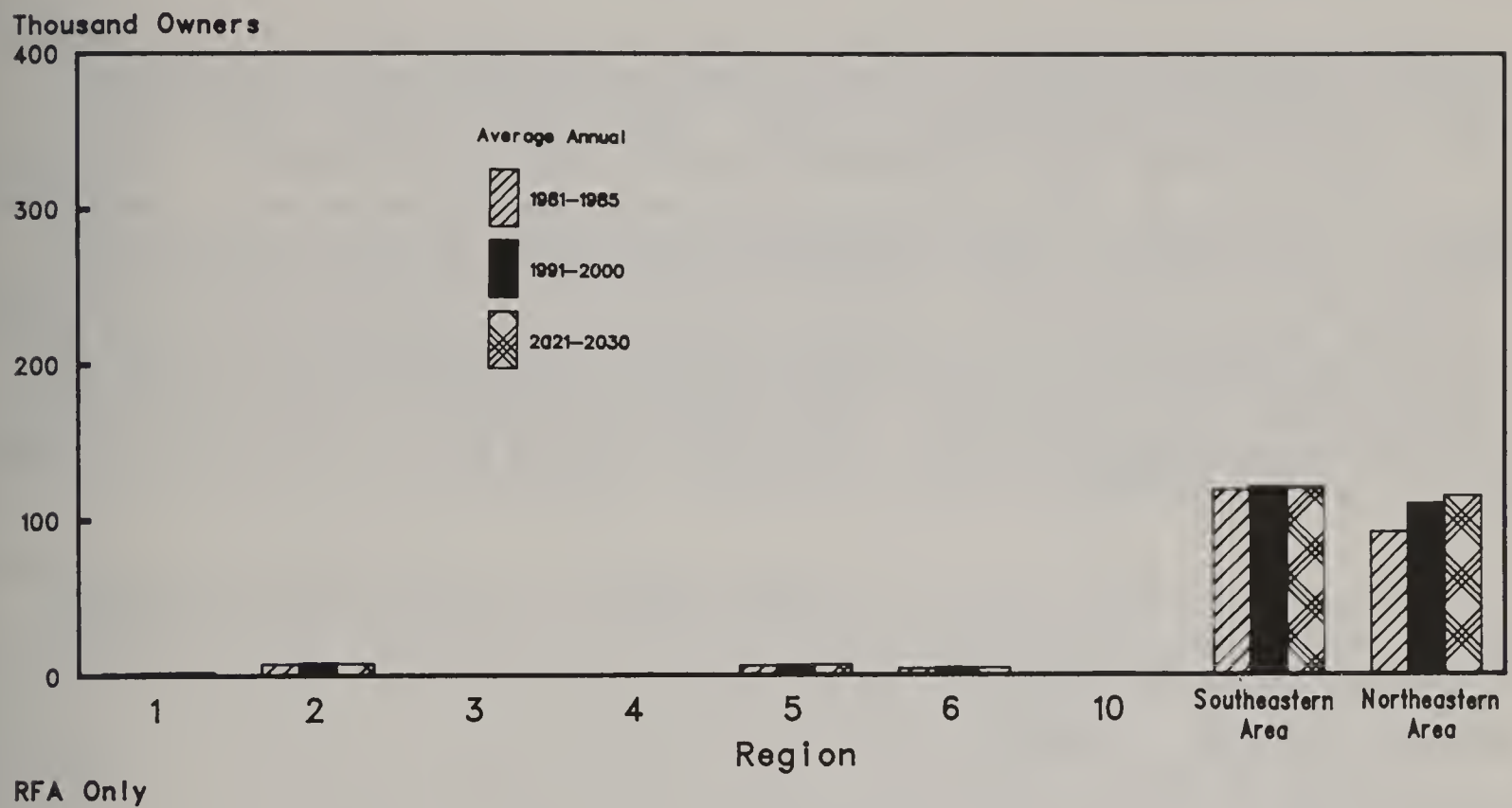
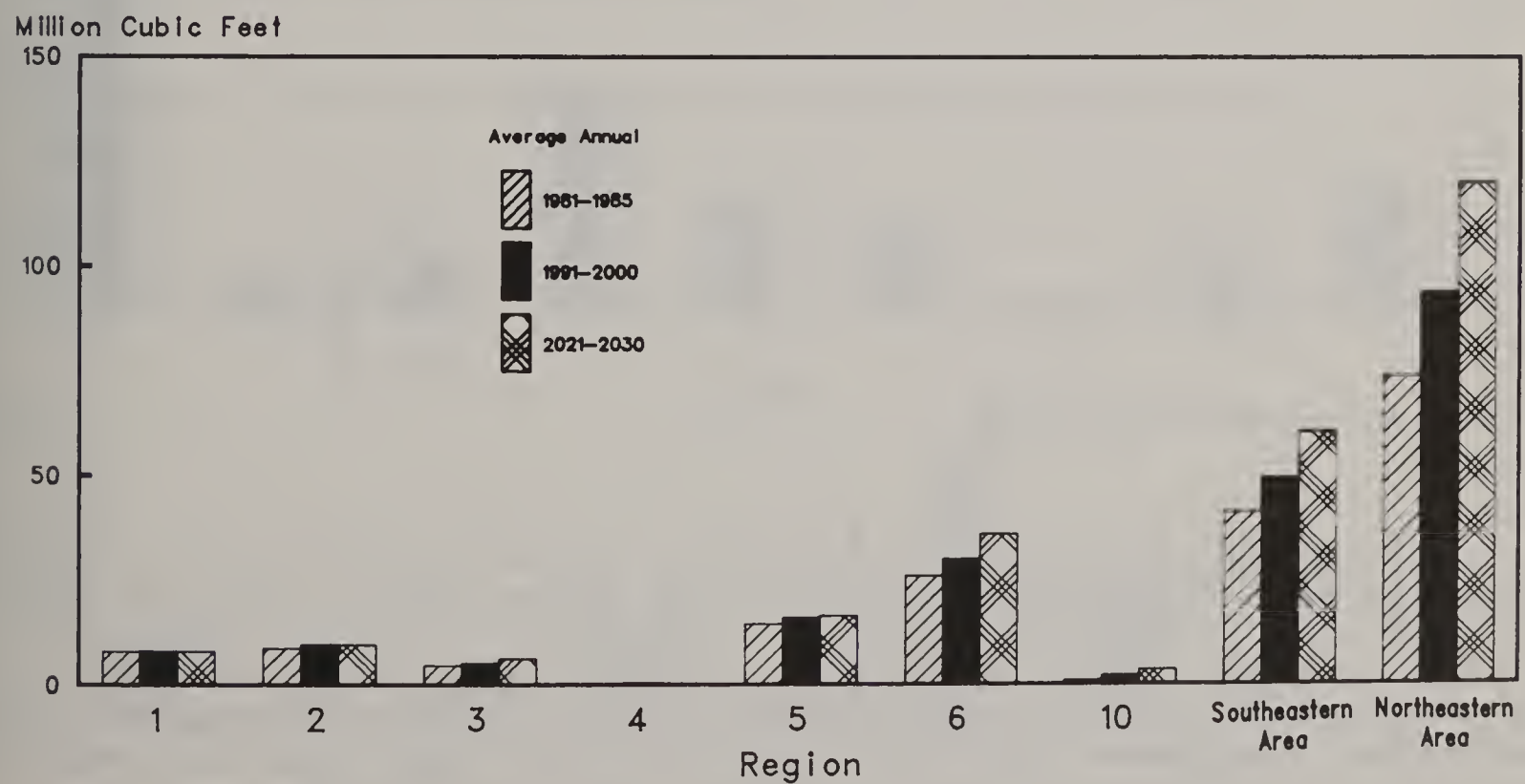


Figure 3.151

Regional Estimates-Alternative 5 Improved Wood Utilization (S&PF)



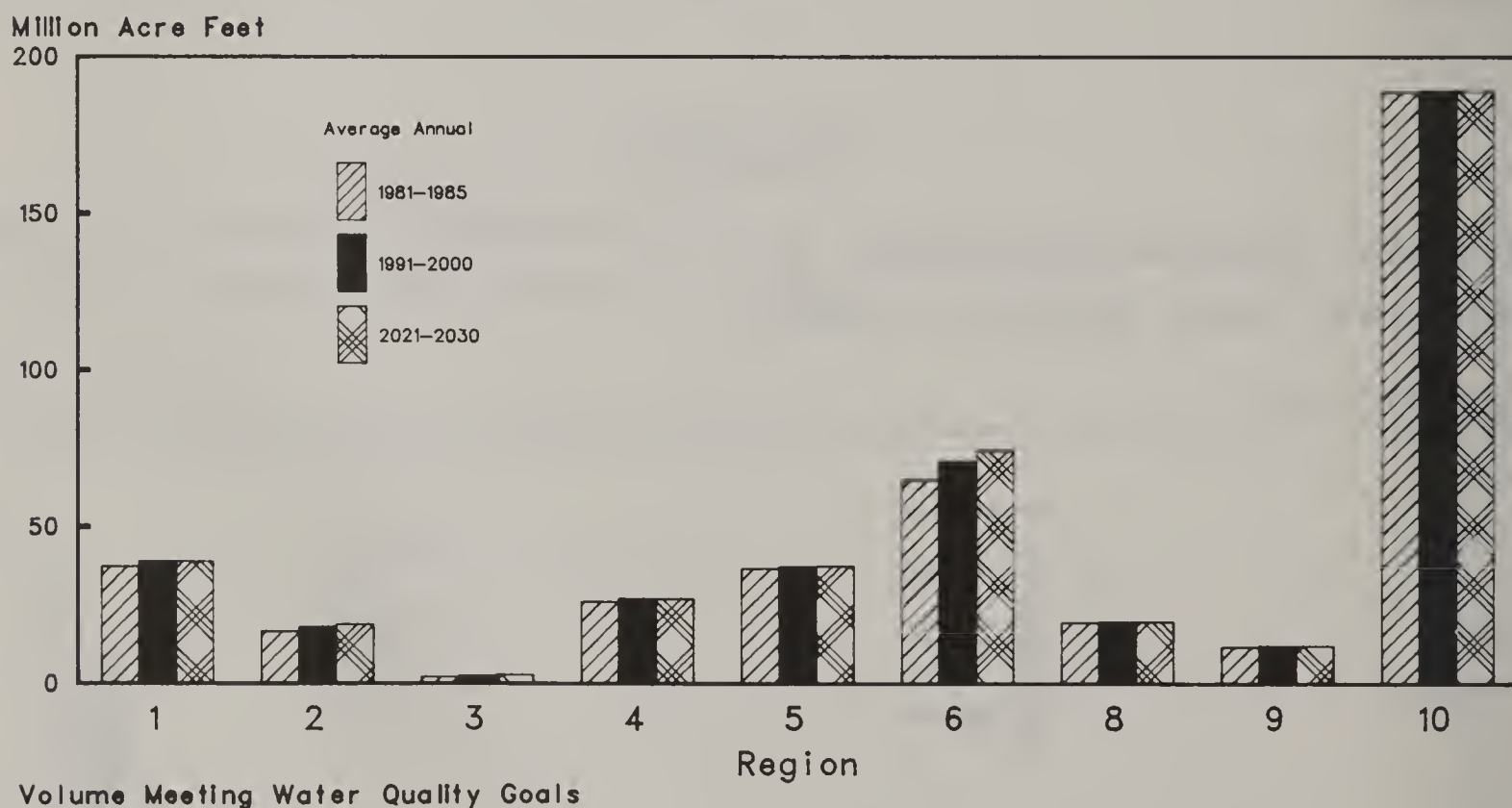
Water resource research.--Develop and use scientific knowledge to maintain onsite water resource of adequate quantity and quality for recreation and propagation of game, fish, and wildlife; increase water yields for offsite uses in water-short areas; and eliminate discharge of pollutants with emphasis on maintaining aquatic ecosystems.

Outputs and Activities

National Forest System.--Water activities in this element are in addition to support services required to provide for nondegradation of the water resource due to other resource activities. Water quality goals would be met for all water yielded from the National Forests by the year 2000. The quantity and intensity of water resource inventories would increase in the first 5 years. The inventory level attained by 1985 would be fairly constant for the remainder of the analysis. Resource improvements would stress maintenance of existing water quality and yields. Projects to increase quantity or quality would be implemented on a selected basis. Maintenance needs would parallel the level of implementation. Water quantity generally would remain the same, and the percentage of water currently meeting water quality goals would increase (figure 3.153).

Figure 3.153

Regional Estimates-Alternative 5 **Water Quality (NFS)**



State and Private Forestry.--Moderately increased technical and financial assistance would be available to protect and improve quality, quantity, and timing of water yields for non-Federal forest lands. This assistance would be directed to the highest priority plans and practices to improve water quality, incorporate watershed management principles in forest resources planning, develop best management practices, improve municipal watersheds and streamside management, and implement onsite and offsite soil stabilization practices.

Research.--Research would determine the water resource amenities and requirements for recreation and propagation of fish and wildlife. Hydrologic processes of forest ecosystems would be quantified and the effects of management practices on water yield and distribution evaluated. Nonpoint source pollution would be assessed and its effect on aquatic ecosystems evaluated and control measures developed.

Minerals

National Goals

Operations, NFS.--Maintain current capability to act on mineral proposals. Integrate proposals and resulting activities with other resource plans and needs. Improve capability to act on proposals relating to energy minerals.

Assistance to States and private landowners, S&PF.--Cooperate with States and private landowners in planning related to mineral operations and reclamation of disturbed lands.

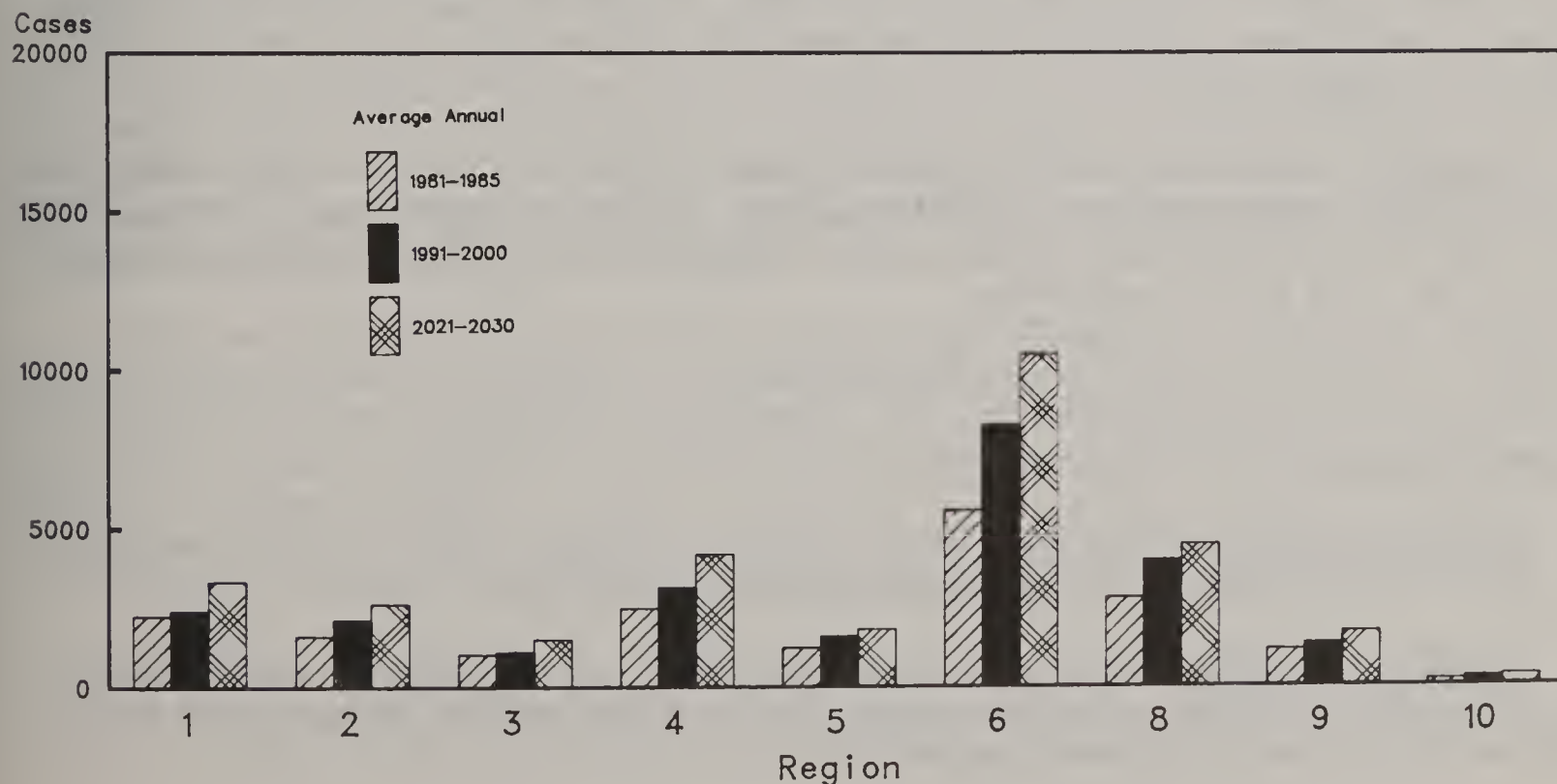
Surface environment and mining research.--Develop and use scientific knowledge to meet water quality standards for streamflow from mined areas; maintain integrity of undisturbed ecosystems near mined areas; and protect and maintain valuable ecological, scientific, and educational sites.

Outputs and Activities

National Forest System.--Under this Alternative, moderate efforts could be made to process requests for mineral operations on National Forest System lands, to examine claim validity and determine trespasses, and to supply mineral information for land management planning purposes. Priority would be given to processing applications involving energy and energy-related minerals. This level would permit processing an anticipated 16,600 operating plans in the year 1981. Numbers processed would increase to an estimated 30,500 operating plans by 2030 (figure 3.154).

Figure 3.154

Regional Estimates-Alternative 5 Mineral Leases and Permits (NFS)



State and Private Forestry.--Technical assistance to State forestry agencies and coordinating functions in mined land reclamation on non-Federal lands would be slightly increased. New initiatives for improved coordination with other agencies would be undertaken in critical problem areas.

Research.--Research would evaluate the chemical and physical properties of mine wastes, identify potential pollutants (including heavy metals), and develop techniques for revegetation of mine spoils so that erosion would be minimized and streamflow water quality standards met. Associated undisturbed ecosystems would be identified and techniques developed for their potential.

Human and Community Development

National Goals

Employment and training programs, NFS, S&PF, and Research.--Continue current level of involvement in employment and training programs for youths, older Americans, and the disadvantaged.

Urban and community forestry cooperation, S&PF.--Maintain cooperative urban forestry programs.

Urban and community forestry research.--Increase scientific knowledge to assess human benefits of urban forests and to understand biological and physical processes of urban forests.

Outputs and Activities

National Forest System.--Alternative 5 is a continuation of the Fiscal Year 1978 program. Only Alternative 1 has a lower level of activity. The present program is moderate in effort and use of Forest Service capabilities.

State and Private Forestry.--Small increases in financial and technical assistance to States and cities for urban and community forestry would provide some additional Federal encouragement for cooperative efforts to plan urban forestry programs, to maintain urban trees, and to utilize wood from trees in urban areas. Assistance would be directed to selected high priority areas and to short-term critical needs rather than long-term goals and objectives. Regional variations in anticipated numbers of urban areas assisted are illustrated in figure 3.155.

Research.--Research would produce information on how urban and community forests could be managed for visual quality, climatic conditions, air quality, water quality and quantity, waste water disposal, wildlife, recreational opportunities, and wood production.

Protection

National Goals

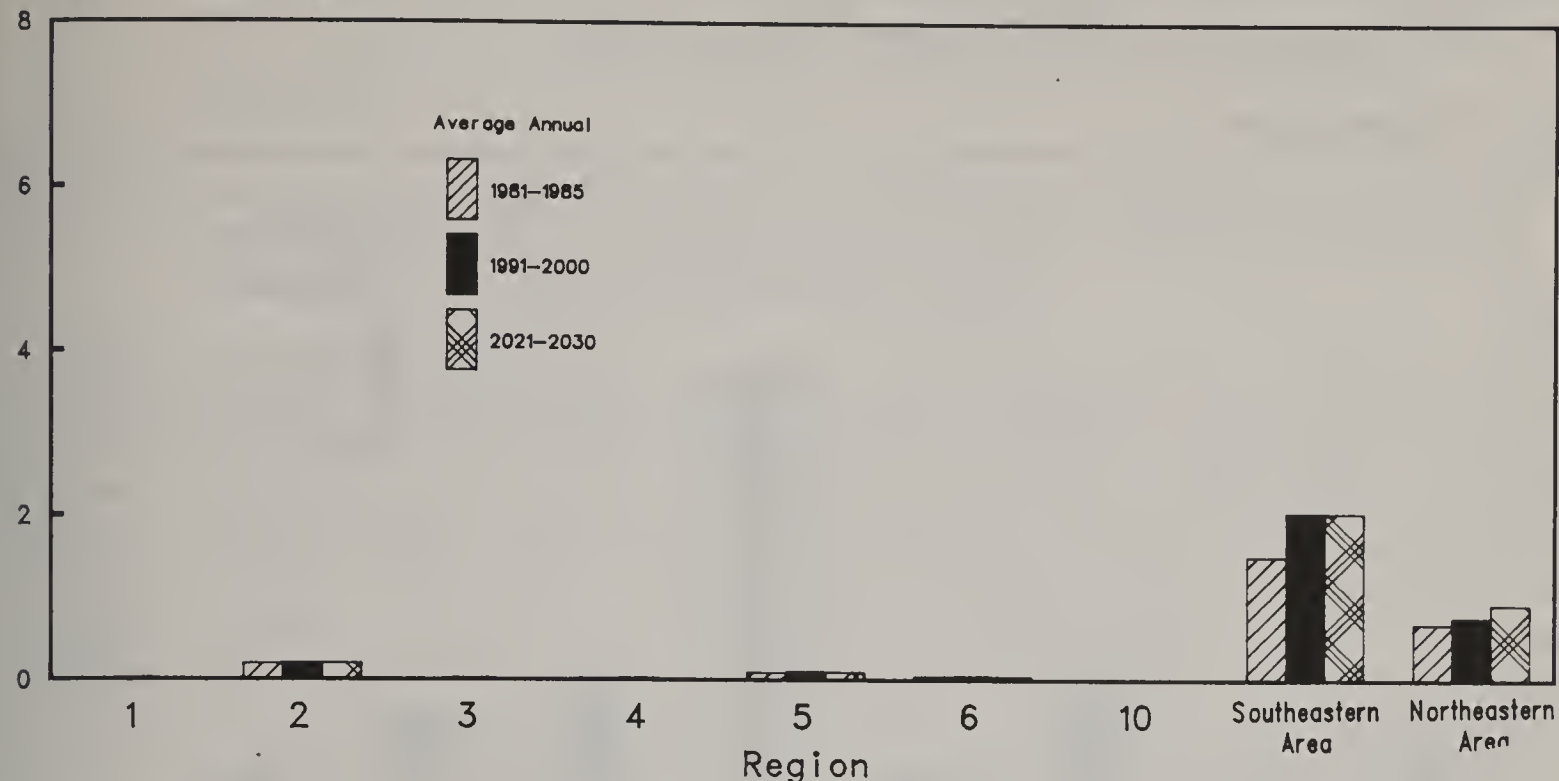
Protection, NFS.--Provide current level of insect and disease management, fire use and management, and law-enforcement activities.

Air quality, NFS.--Provide a moderate level of air quality management, with emphasis on studying and managing air-quality related values, and emissions derived from management activities.

Regional Estimates-Alternative 5

Urban and Community Forestry (S&PF)

Thousand Urban Areas



Cooperation with others, S&PF.--Continue the current level of technical assistance, cooperation, and cost sharing for insect and disease control and rural fire prevention and control.

Insects, disease, and fire management systems research.--Maintain current basic and applied research programs to develop new and improved insect, disease, and fire management systems.

Social, economic, and environmental effects research.--Maintain current basic and applied research programs on methods to identify, assess, and predict net social, economic, and environmental effects of insects, diseases, air pollutants, and fire.

Outputs and Activities

National Forest System.--Provision would be made for protection from and use of fire directed towards obtaining the current level of outputs, maintaining basic resources, and providing for public safety. Fuels management would concentrate on the protection and enhancement of current outputs to ensure that activity created fuels would be adequately treated. Some visual impact, though minimized, could be tolerated.

Fire management outputs on NFS lands are reflected in the Fire Management Effectiveness Index--a measure of the cost of protection plus the net damages per thousand acres protected. Estimates for the nine NFS Regions are shown in figure 3.156. Regional data are also shown for fuelbreaks and fuel treatments in figure 3.157.

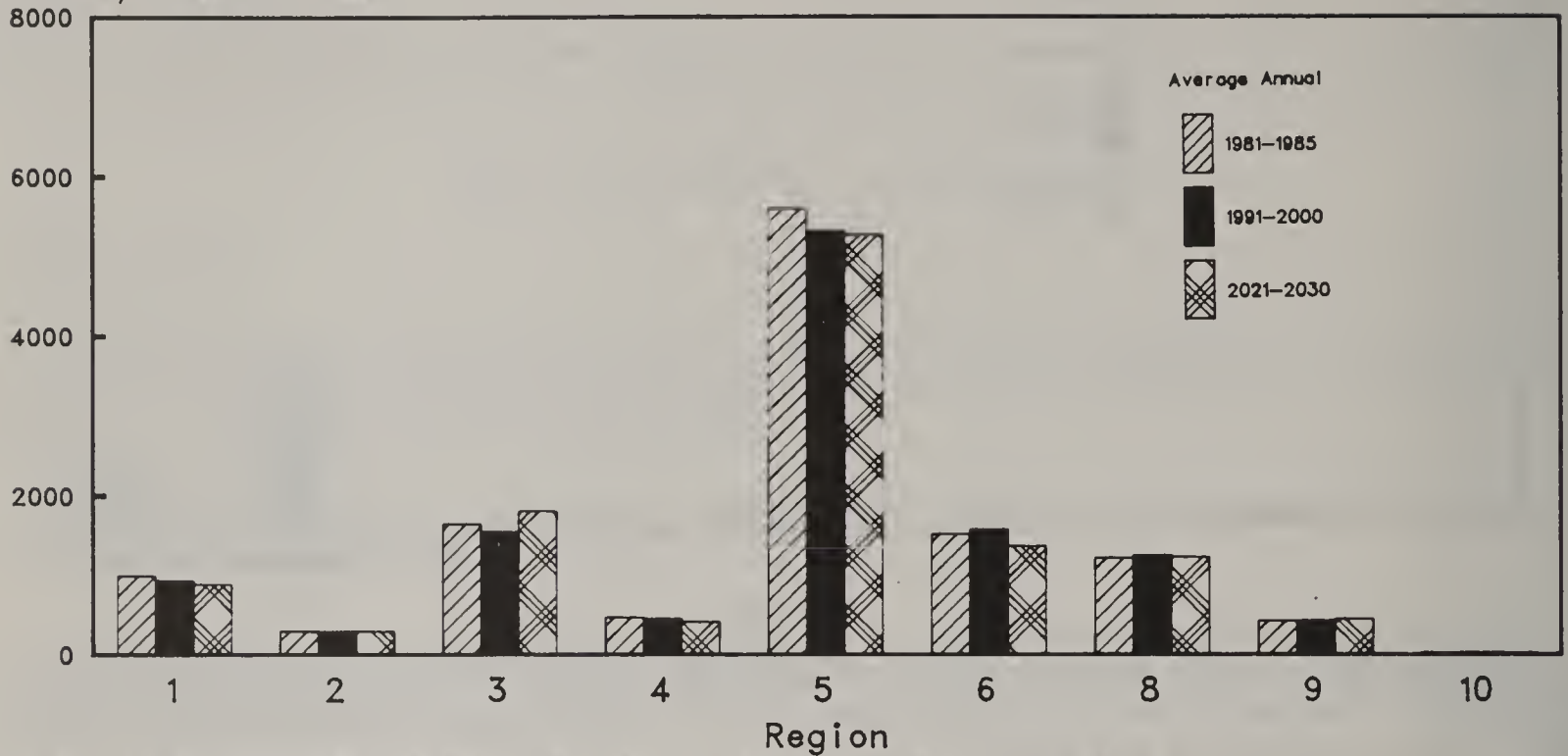
Significant aspects of Alternative 5:

- The index value is moderate. With this level of planned fuel treatment, fuels would continue to accumulate from natural processes faster than the rate of treatment.

Figure 3.156

Regional Estimates-Alternative 5 Fire Management Effectiveness Index (NFS)

Dollars/Thousand Acres

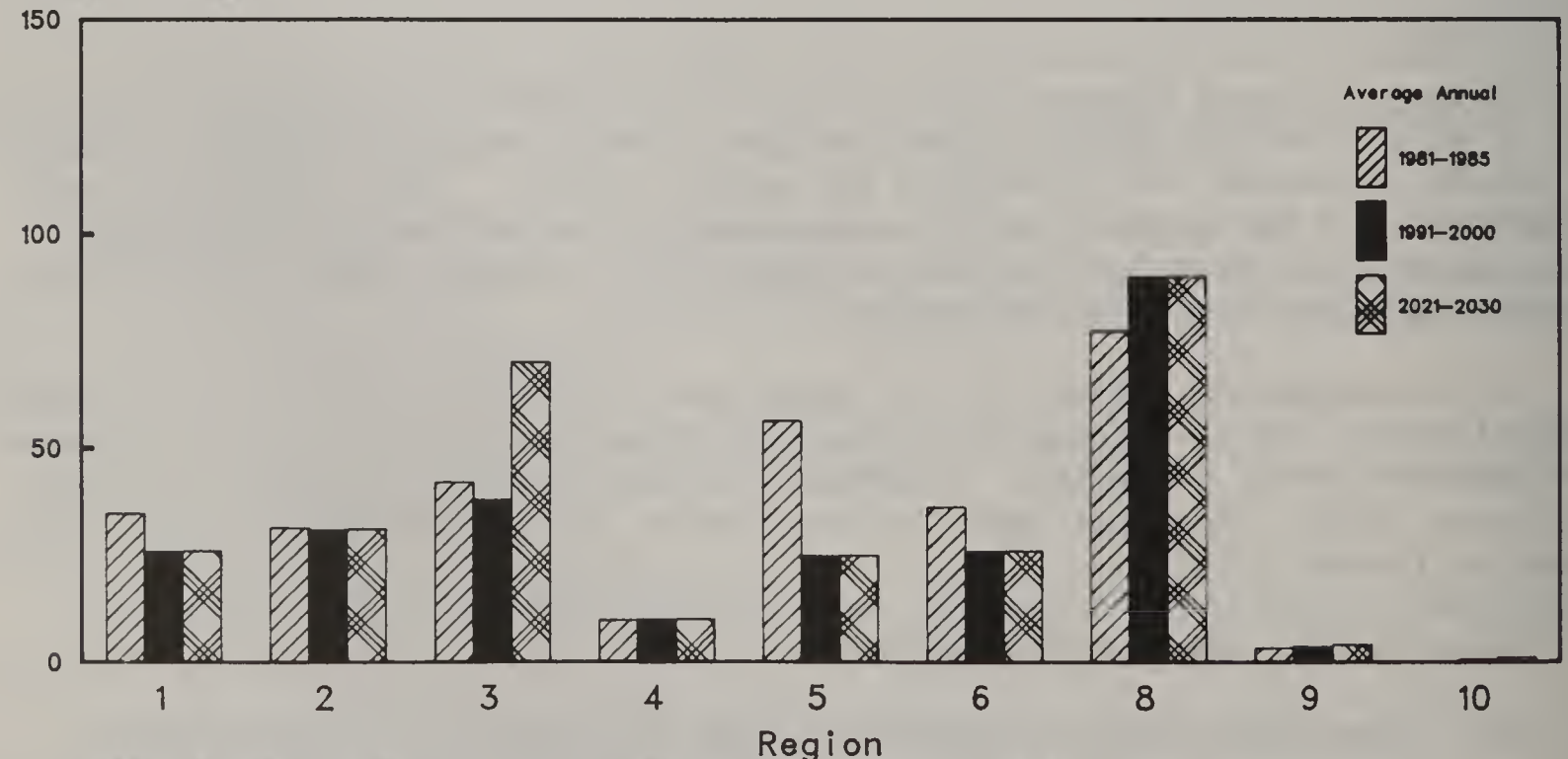


Fire Management Effectiveness Index is a Measure of Cost Plus Loss

Figure 3.157

Regional Estimates-Alternative 5 Fuelbreaks and Fuel Treatment (NFS)

Thousand Acres



Includes Fuelbreak Construction and Treatment of Natural Fuels.
Excludes Treatment of Activity Fuels.

- Air quality management would be directed toward minimizing visual impacts, although some could be tolerated.
- Emphasize insect and disease management activities for protection of timber, range, recreation, and water values utilizing new technology and benefit-cost evaluation of suppression strategies.
- Concentrate law enforcement on protecting marketable outputs from destruction or trespass, and be less concerned with the enhancement of nonmarketable activities.

State and Private Forestry.--Insect and disease control: Direct actions on National Forest System lands and cooperative actions on other public and private forest lands for insect and disease prevention, detection, evaluation, and control would be maintained along current program trends. Regional variations in acres surveyed are illustrated in figure 3.158. Effective prevention activities would be done at a moderate level through resource planning, program development, and preventive thinning. New programs, such as urban tree protection and protection of wood in use, could be implemented, but only at a nominal level. Integrated pest management practices would continue. Training, technology transfer, pilot projects, loss assessment projects, and demonstration areas would be maintained at moderate levels. Technical assistance, cost sharing, and cooperation with States would continue along current program trends.

Rural fire prevention and control: Continuation of the current level of Federal financial, technical, and related assistance for rural fire prevention and control would not significantly help State Foresters or equivalent State officials to obtain the goals outlined in their 1974 Fire Protection Analysis. Very limited Federal assistance would be available to train those who replace retiring personnel in State fire organizations. Intensive fire protection would be essentially limited to urban high-value watersheds, and other high-value lands. Contract prevention programs would be limited, but mass media prevention programs would be increased. Limited presuppression activities would be undertaken. Neither environmental conditions nor incentives for forestry investments would be significantly altered in the short term. There would, however, be some detrimental environmental effects. Assistance provided for rural community fire protection is expressed in terms of approved applications in figure 3.159. Fire losses would approximate current trends in most Regions as illustrated by figure 3.160. In Alaska, reported acreage burned is expected to continue to rise due to large increases in the area to be included under the State fire protection program without commensurate increases in program size.

Research.--Fire and atmospheric sciences research: Scientific knowledge and technology would be developed, leading to integrated fire management systems that would improve fire prevention, fire suppression, and fire use methods. The results would support moderate outputs of market commodities from National Forest System lands and low outputs from State and private lands.

Forest insect and disease research: Current basic and applied research programs would be maintained on methods to identify, assess, and predict the net social, economic, and environmental effects of insects and diseases, commensurate with moderate-level market outputs and low-level nonmarket outputs. Research would be directed toward support of timber, range, recreation, and

Regional Estimates-Alternative 5 Insect and Disease Surveys (S&PF)

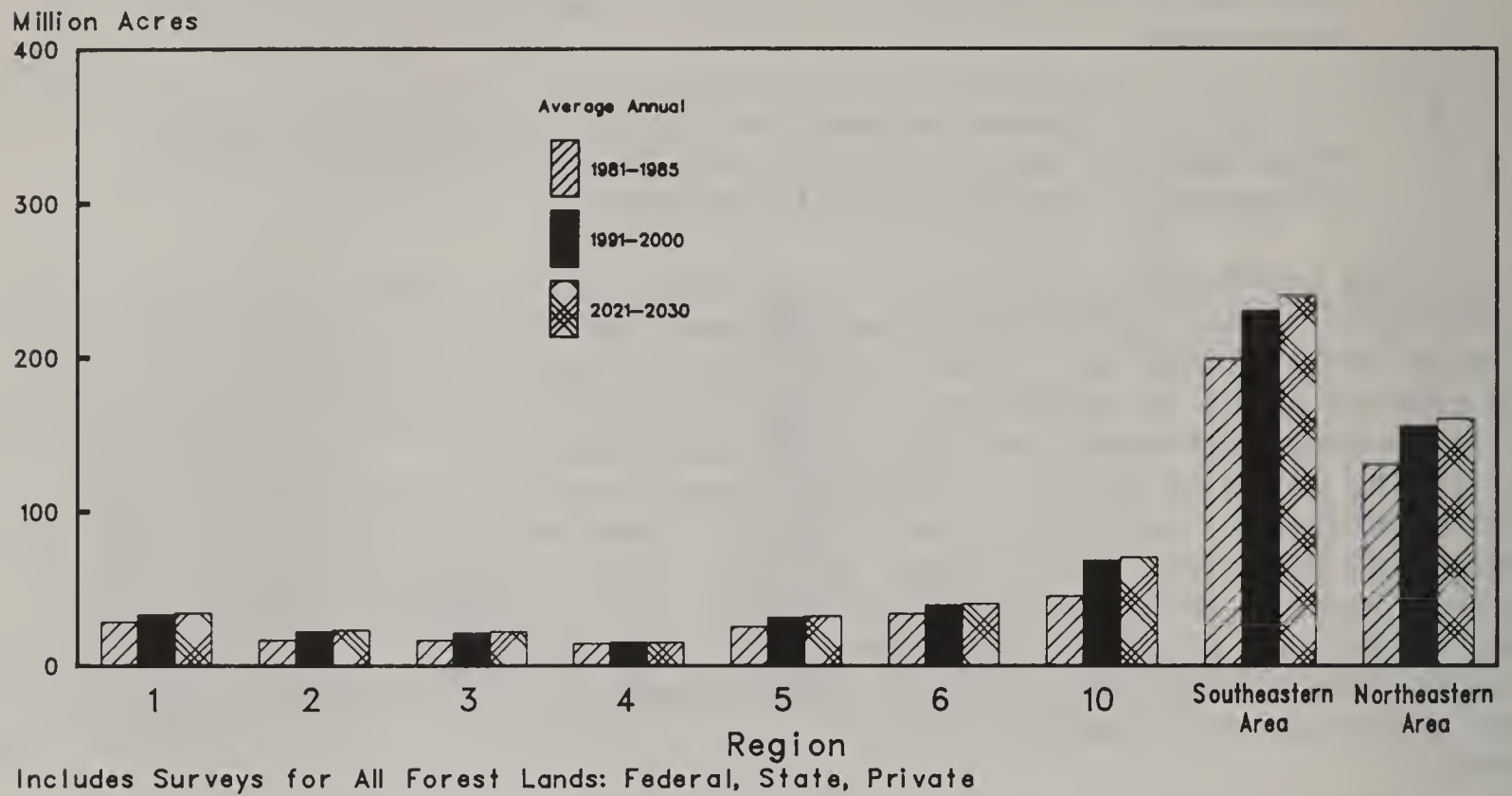
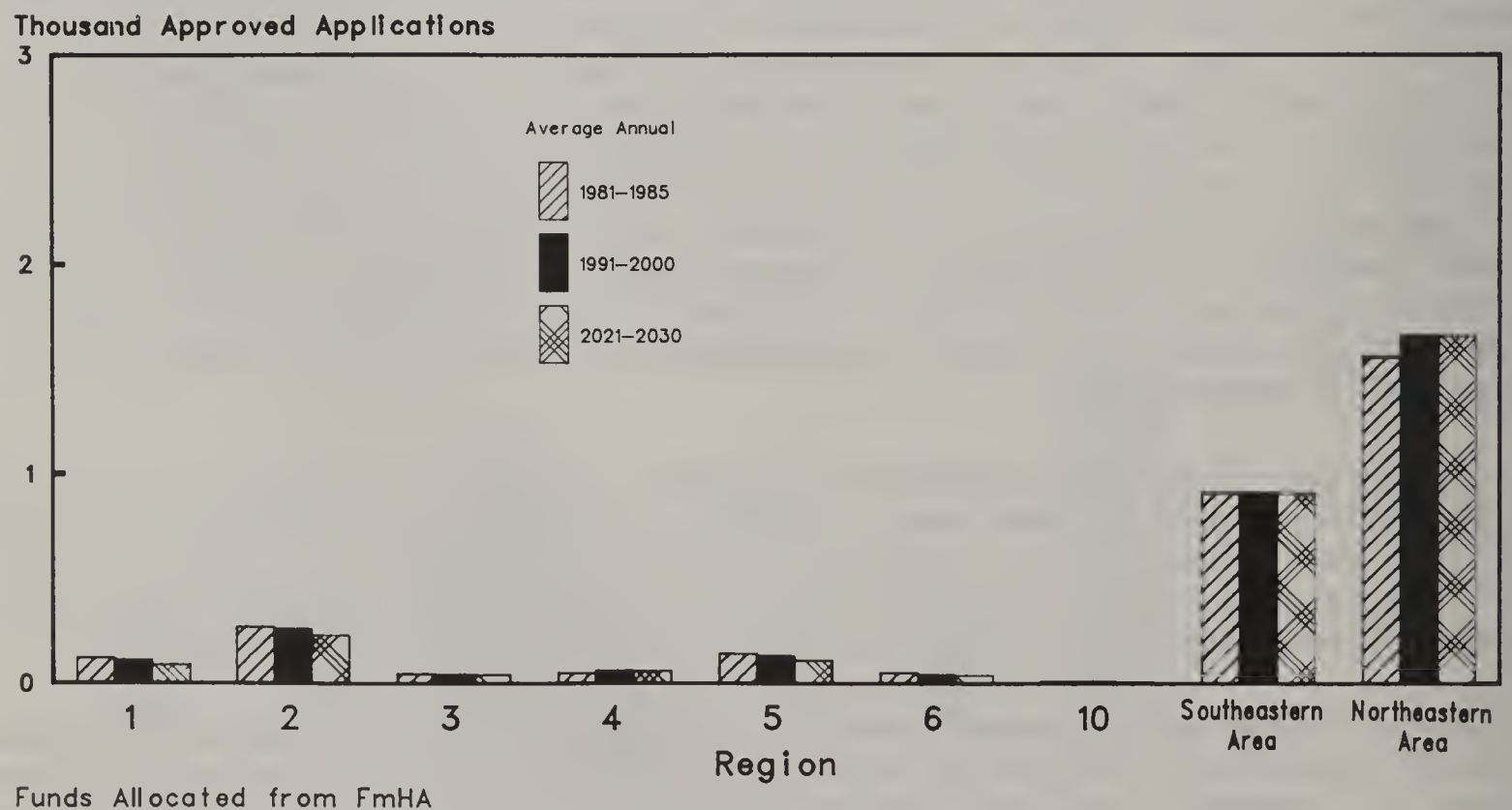


Figure 3.159

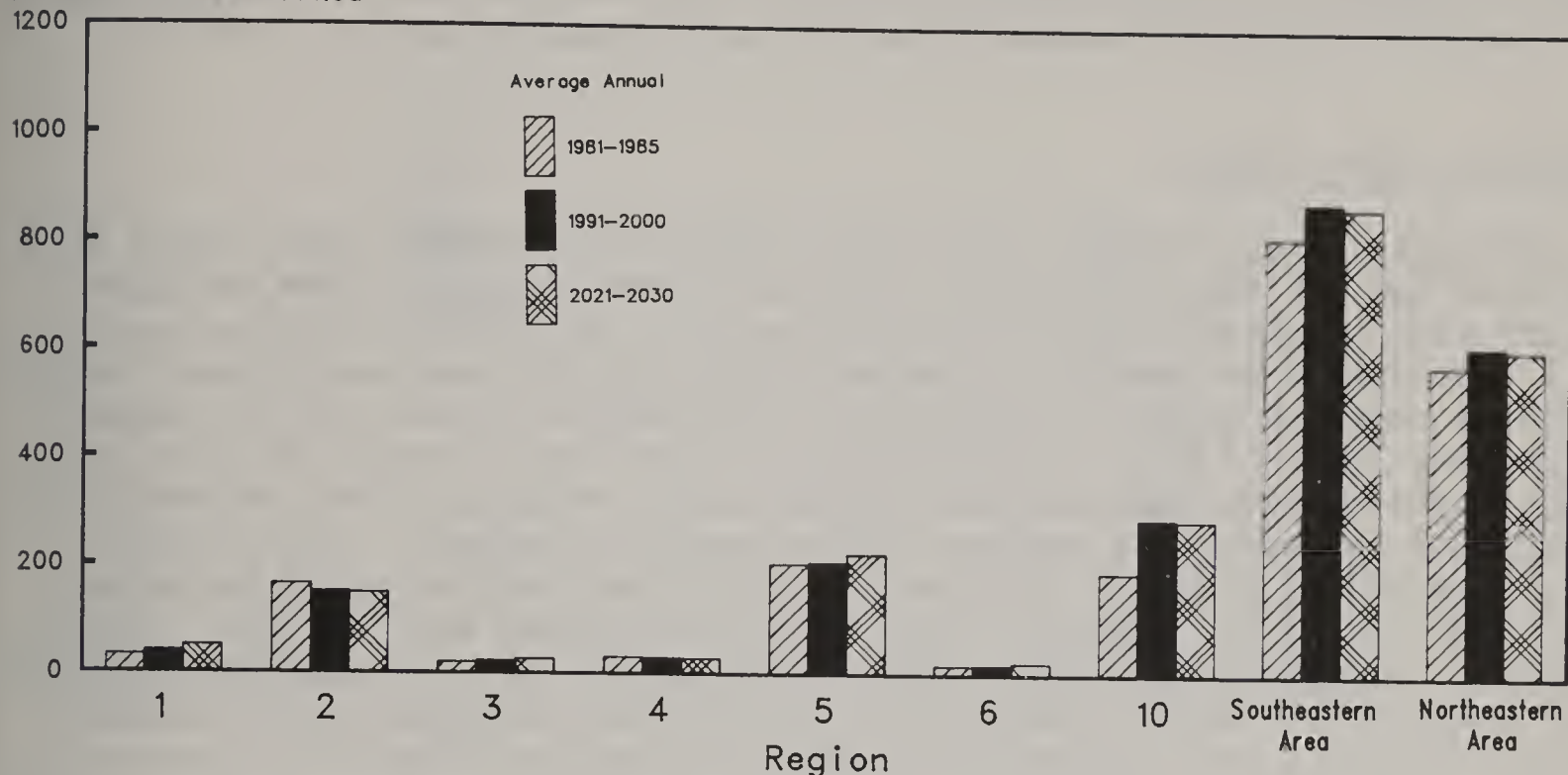
Regional Estimates-Alternative 5 Rural Community Fire Protection (S&PF)



Regional Estimates-Alternative 5

Fire Loss on Protected Area (S&PF)

Thousand Acres Burned



water outputs. Research to understand biotic and abiotic factors which influence populations of pests would be continued.

Research emphasis would be on pest management techniques applicable for protection of timber, range, recreation, and water values. Improved methods would be tested and published to evaluate benefits and costs of various treatment strategies and decisionmaking guidelines for land managers.

Lands

National Goals

Land management planning, NFS.--Provide current level of land and resource management planning and a limited level of related special studies.

Land status, NFS.--Provide current level of landline location and marking, title claims, and land exchange and acquisition. Complete and maintain land status data system records to meet management planning and program commitments. Facilitate early completion of Native and State land selections in Alaska.

Special land uses, NFS.--Continue current efforts to plan and provide for special land uses.

Cooperation in State forest resource planning, S&PF.--Moderately increase cooperation and technical assistance to States for forest resources planning.

Forest Resources Economics Research.--Develop and use scientific knowledge to provide economic analyses required for maintenance of forest and range resources management programs.

Renewable resources evaluation research.--Moderately increase timber inventory intensity, shorten analysis cycles, and develop basic information for all renewable resources to meet broad planning requirements.

Outputs and Activities

National Forest System.--Land and resource development plans would be completed for all lands within the National Forest System by the mandatory October 1985 completion date. Planning and special studies would be moderately accelerated to complete planning before the due date and intensified to achieve a moderate level of reliability consistent with the need to support the planned level of resource development. Landline location, marking, and status would be at a moderate level to support a moderate level of market outputs and to discourage new and resolve current trespass. Title claims activity would be minimal. Land purchases, using Land and Water Conservation Funds, would be at a high level until the program ends in 1989. Land purchases, using regular (Weeks Act) funding, would be at a moderate level to acquire critically needed lands and to improve the manageability of eastern National Forests, but substantially below optimum for efficient management. The current program of acquiring lands for recreation developments near urban areas and congressionally designated areas would continue, as would acquisition for watershed protection. Other land exchange and adjustments would be at a moderate level to resolve critical problems and to gain the efficiencies of improved landownership patterns (figure 3.161). Special land uses are primarily imposed externally. Needs of others for such uses of National Forest System lands would increase as a result of the increase in the national economy. Efforts would be to fulfill reasonably justified requests for special uses. Existing uses would be managed to protect the public interest.

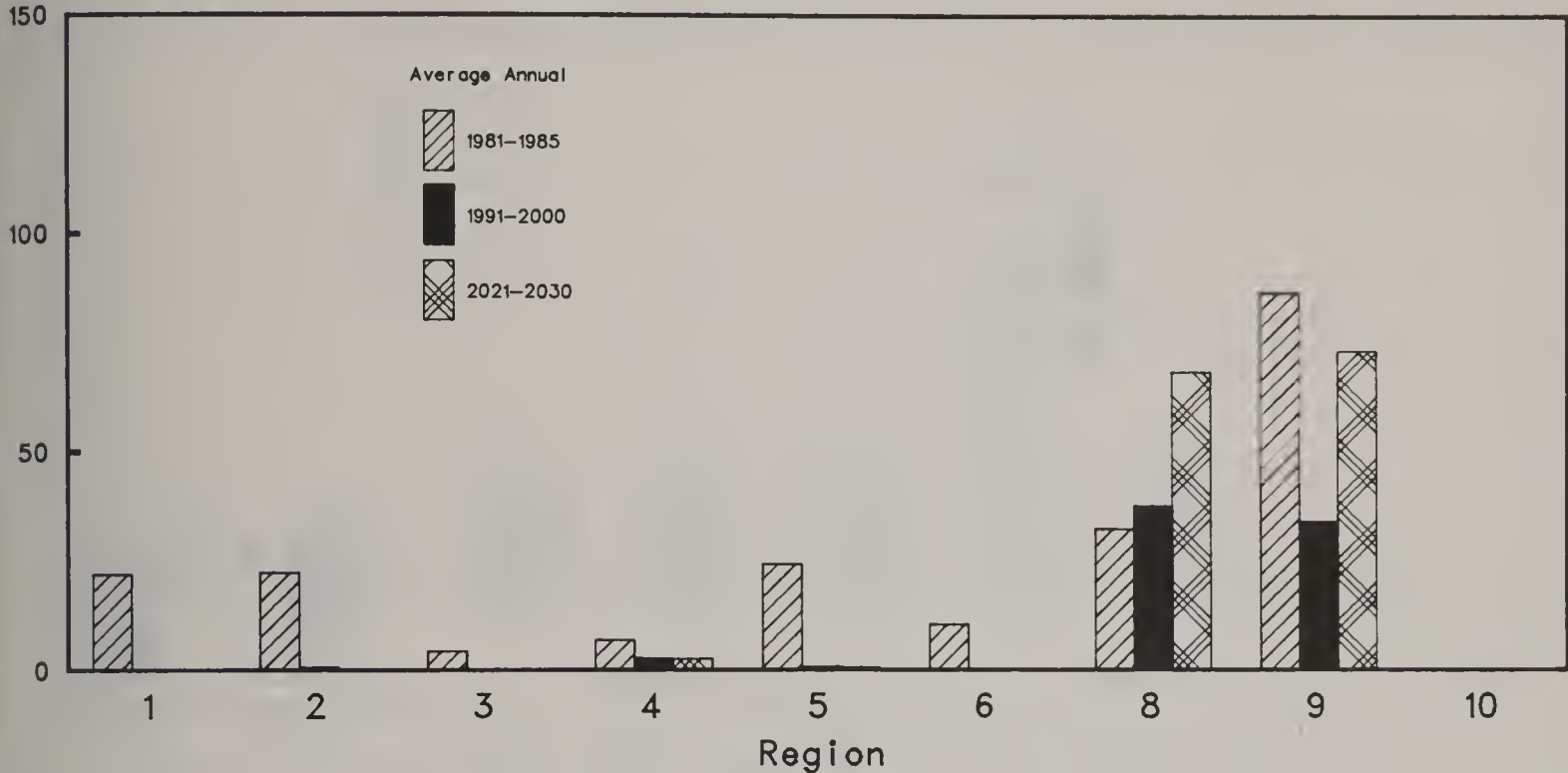
State and Private Forestry.--Moderate increases in Federal financial, technical, and related assistance to States for forest resources planning would provide some additional incentive to assemble, analyze, display, and report State forest resources data, to train forest resource planners, and to consider forestry aspects during natural resources planning at the State and Federal levels. Technical rather than financial assistance would be emphasized, although some funds to employ, train, and support State forest resource planners or to contract for such services would be available. State forest resource plans dependent upon Federal assistance for development would contain a moderate amount of detail. Some assistance for even more detailed subState forest resources planning, National Forest System land management planning, and RPA planning would be strengthened. Figure 3.162 illustrates, on a Regional basis, the acreage for which State forest resources plans would be prepared. Figure 3.163 shows the acreage included in multiresource forest management plans prepared for individual landowners.

Research.--Forest resources economics research would produce increased knowledge required for economic analyses to maintain timber and forage production from National Forest lands. Basic economic data would be provided for nonmarket resources to meet broad management requirements and low-level outputs from Federal, State, and private lands. Costs and benefits resulting

Figure 3.161

Regional Estimates-Alternative 5 Land Purchase and Acquisition (NFS)

Thousand Acres

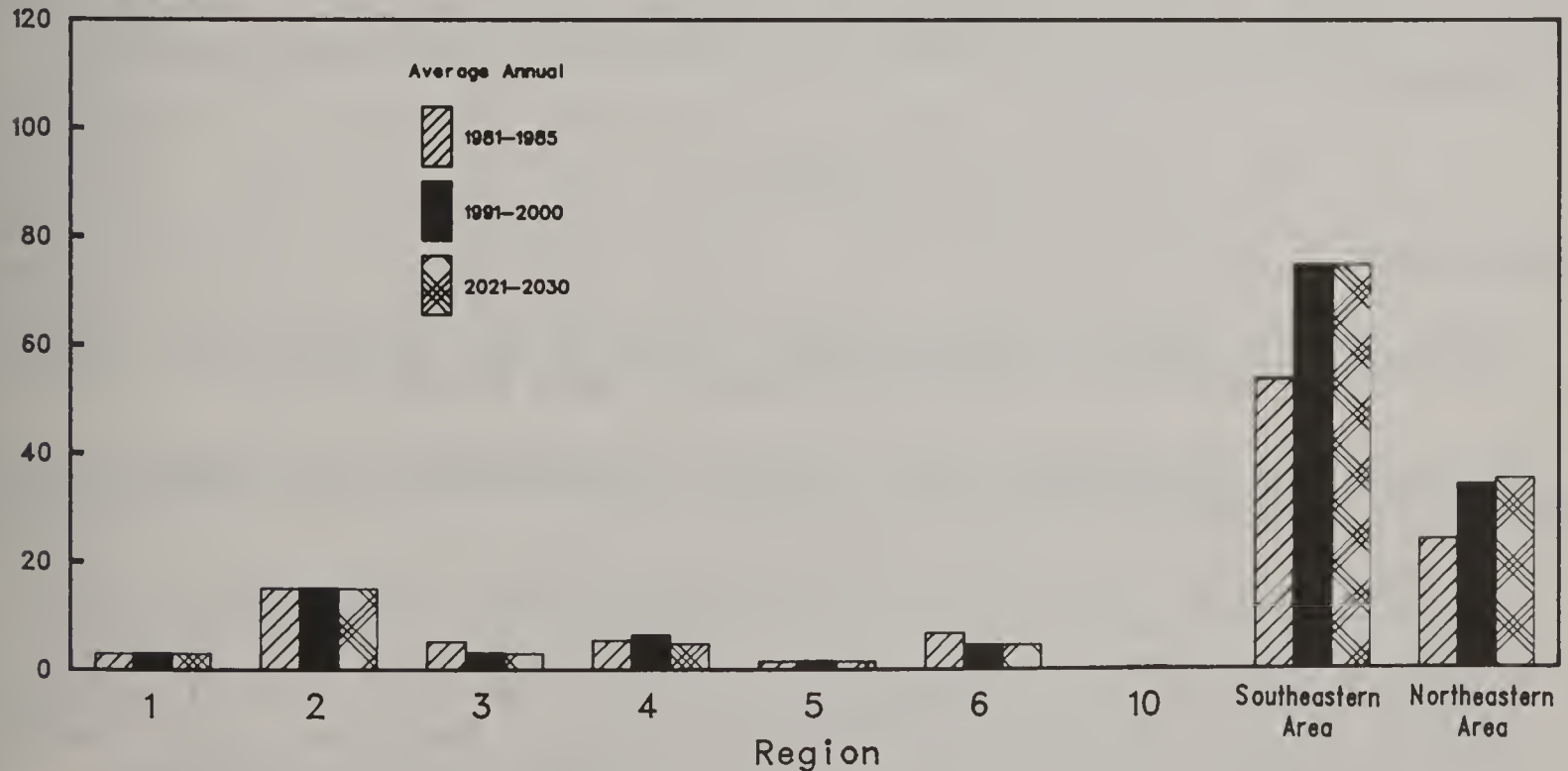


Includes Land and Water Conservation Fund Purchases
Excludes Land Exchanges

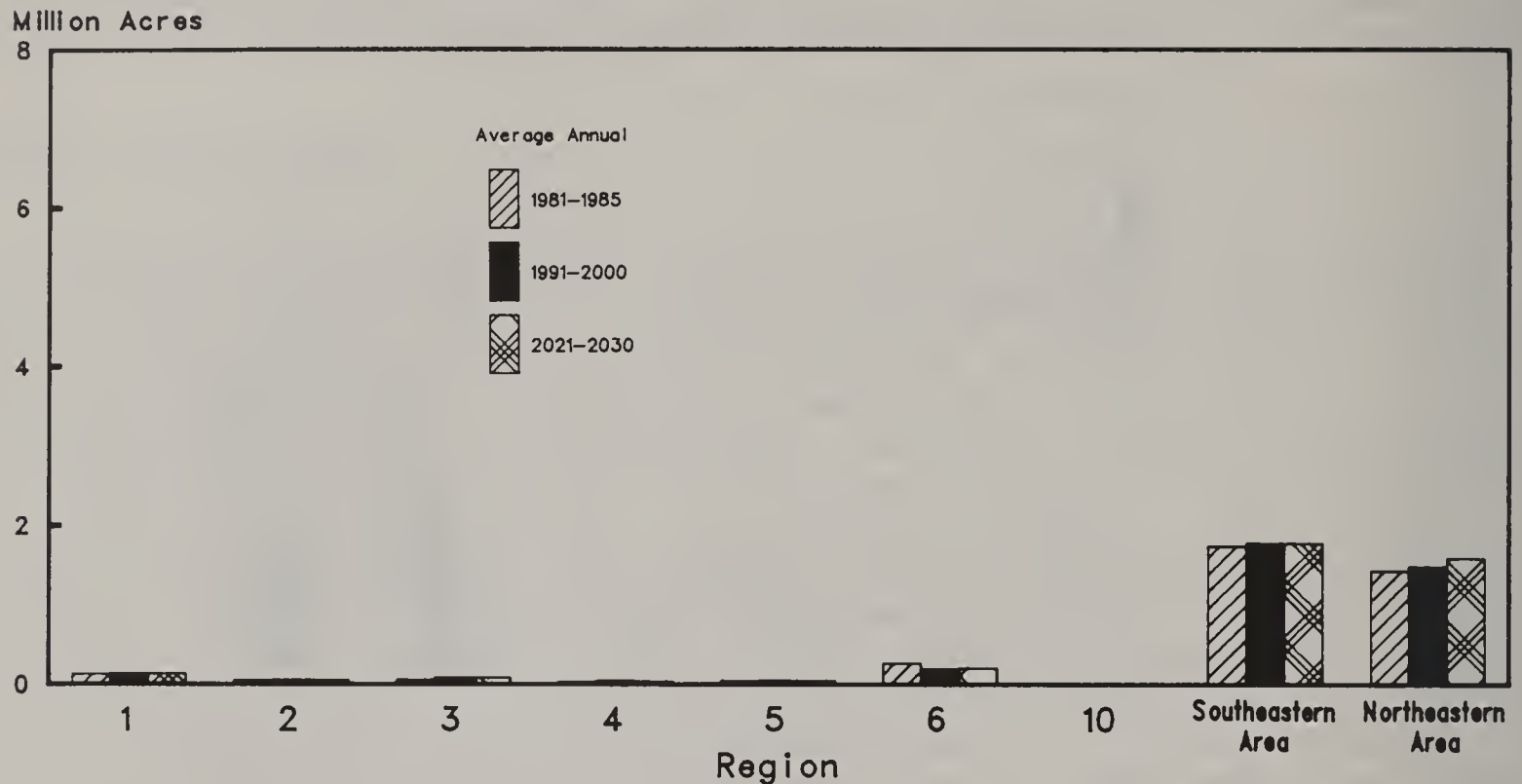
Figure 3.162

Regional Estimates-Alternative 5 State Forest Resource Planning (S&PF)

Million Acres



Regional Estimates-Alternative 5 Landowner Forest Management Plans (S&PF)



from alternative land management practices would be determined for the major forest types.

Renewable resources evaluation research would improve timber and forage inventory and analysis techniques to meet specifications and standards required for intensified management of timber and forage resources. Moderately intensified inventories would be conducted for improved accuracy of timber and forage production, availability and use data. Moderately reduced inventory cycles would improve reliability and usefulness of data in resource management planning. General information would be published on the amount, condition, and availability of nonmarket resources to meet broad planning requirements.

Soils

National Goals

Technical soil support services, NFS.--Provide key technical soil services needed to maintain and selectively improve soil productivity.

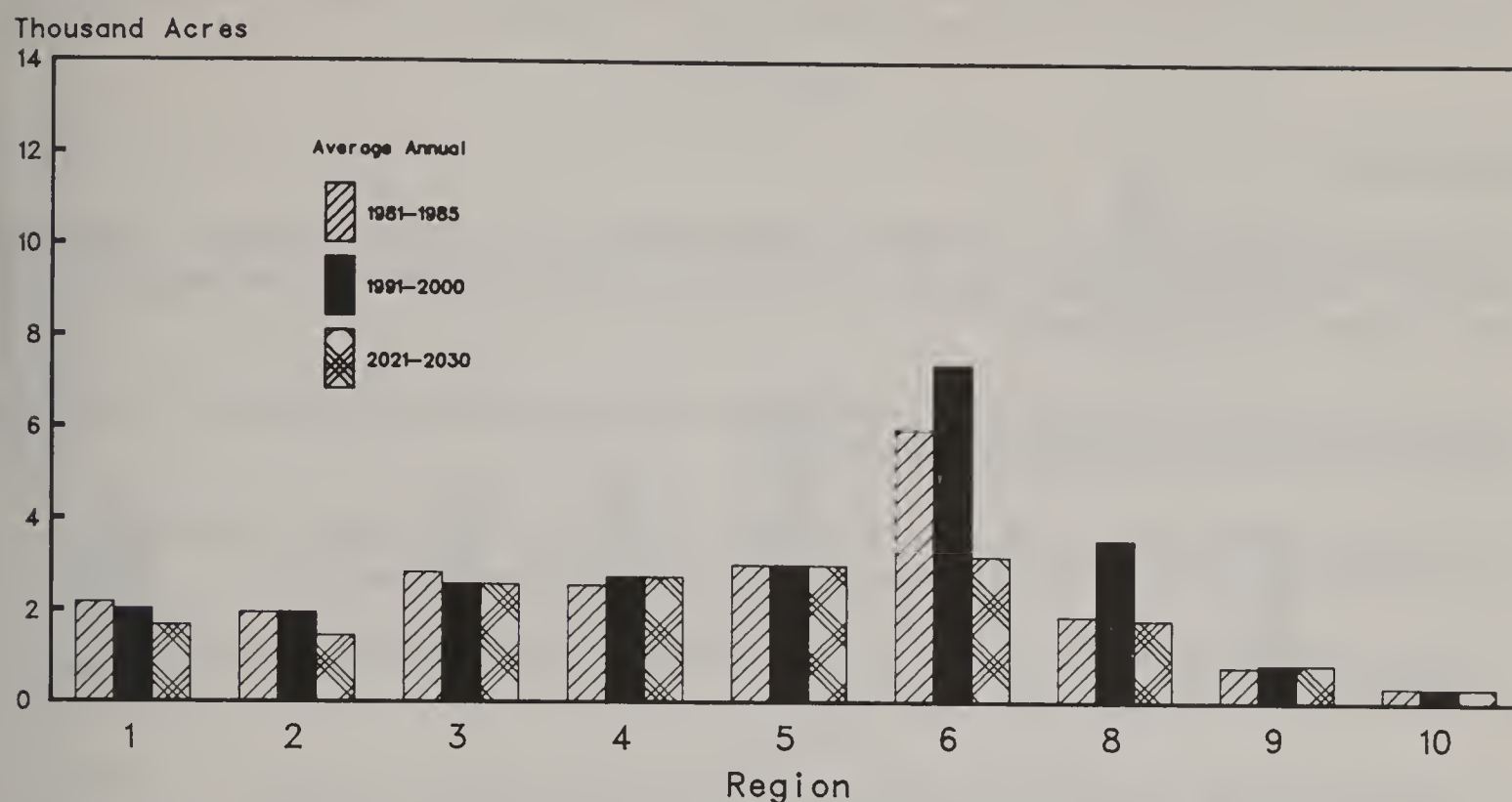
Soil resource improvement, NFS.--Selectively implement soil resource improvements to enhance soil productivity.

Soil inventories, NFS.--Provide soil inventory data at current levels.

Abandoned mineland reclamation, NFS.--Provide for current level reclamation efforts. Give priority to areas where there are important public health and safety problems or significant erosion and water pollution problems.

Regional Estimates-Alternative 5

Soil and Water Quality Improvement (NFS)



Technical assistance S&PF.--Provide limited technical assistance and training in soil data interpretations for forest management purposes in co-operation with the Soil Conservation Service.

Soil management research.--Continue current research efforts to develop and use scientific knowledge to provide necessary soil resources information for recreation and wildlife habitat, increased timber and range production on selected sites, and maintenance of aquatic ecosystems.

Outputs and Activities

National Forest System.--Soil activities would be in addition to the support services required to maintain soil productivity, and to provide for non-degradation of the soil resource due to other resource activities. The quantity and detail of soil resource inventories would increase in the first 5 years. The inventory level attained by 1985 would be fairly constant for the remainder of the analysis period. Resource improvements would stress maintenance of existing soil productivity. Projects to increase commodity outputs would be implemented on a selected basis (figure 3.164). Maintenance needs would parallel the level of implementation.

State and Private Forestry.--Technical assistance and training in soil data interpretations for forest management purposes would continue to be available on a limited case-by-case basis. Only in the Intermountain Region would cooperative technical assistance be provided specifically for prime forest land mapping. All other field units would incorporate any such assistance within the State forest resources planning program in the Lands element.

Research.--Research would determine the soil requirements of recreation sites and wildlife habitats, and techniques would be developed to reduce soil

erosion to maintain natural terrestrial ecosystems as well as to improve streamflow water quality to maintain aquatic ecosystems. Soil properties limiting timber and forage production would be evaluated, soils with greatest potential for increased productivity identified, and techniques developed to improve productivity on selected sites by fertilization, drainage, etc.

Facilities

National Goals

Utility systems, NFS.--Continue restoration of utility systems required to support resource element goals. Limit introduction of new methods of delivery to new installations.

Building construction, NFS.--Continue construction of essential buildings to maintain current management programs.

Building maintenance, NFS.--Maintain buildings to current health and safety standards. Continue conversion for energy conservation.

Communications, NFS.--Continue installation of communications systems with technologically advanced equipment.

Transportation including roads and trails construction, NFS.--Complete principal transportation network by 2020.

Water impoundments, NFS.--Continue current level of restoration of water impoundments requiring major and minor restoration to meet safety standards.

Research construction.--Construct new research laboratories as needed to continue present research programs. Continue conversion for energy conservation.

Outputs and Activities

National Forest System.--Develop capital investment and maintenance programs which directly support the protection and development of the land and water base of commercial importance.

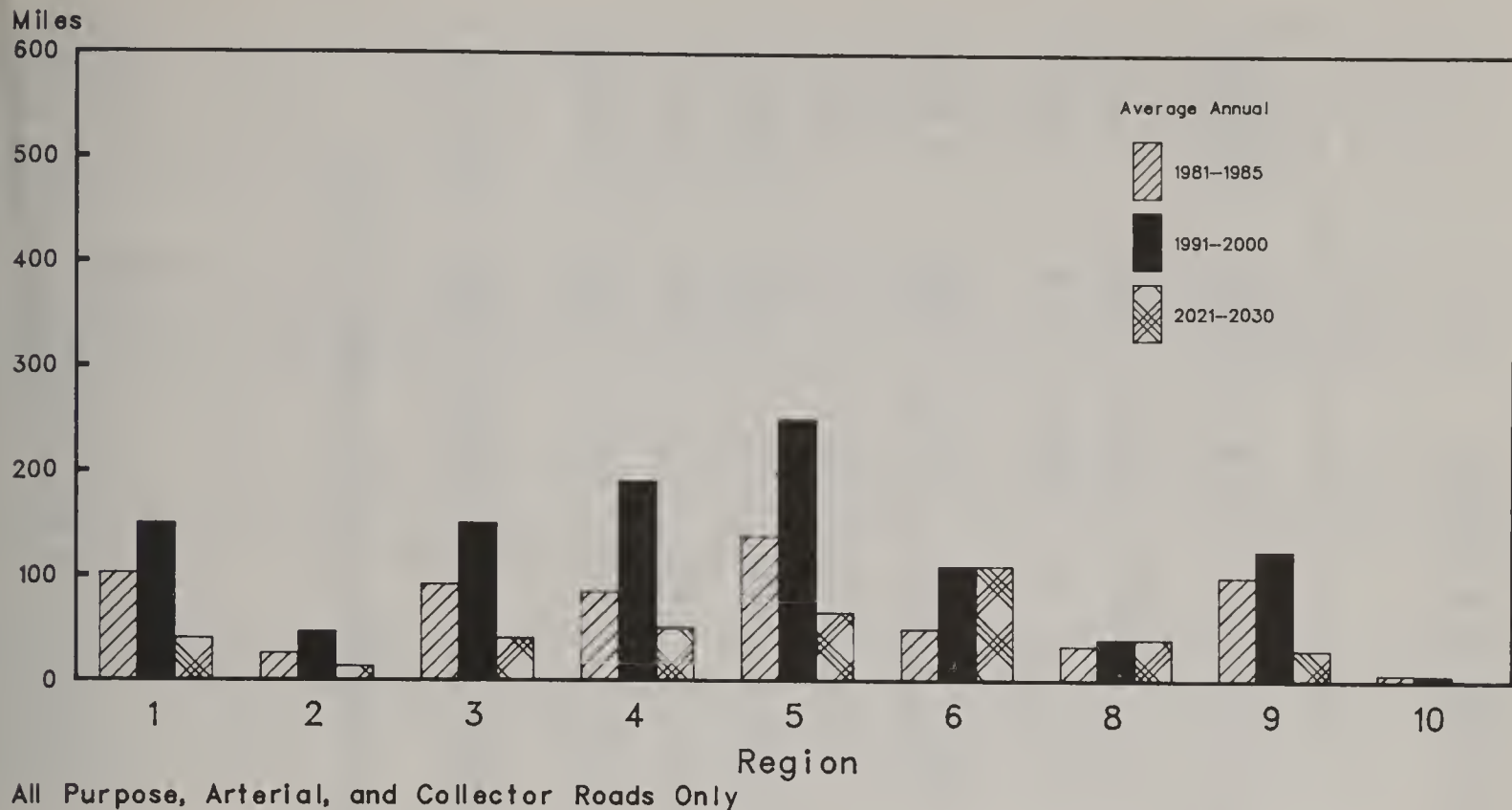
The physical plant would be expanded to restore old and to build new facilities serving the commercial forest land and water base. New technology would be applied to improve efficiency, save money, and improve productivity. Increased work force, use of facilities, and related health and safety concerns would be handled on a current basis. Mobility of work force and commercial users' proximity to land areas where intensive management systems are operable would be of primary importance.

Figure 3.165 displays the work to be accomplished by Regions in order to complete their individual principal transportation systems by the year 2020.

Additional miles of roads to be constructed for specific resource activities are contained in the individual program element outputs, activities, and cost figures.

Regional Estimates-Alternative 5

Road Construction/Reconstruction (NFS)



Research.--The construction of new research laboratories and the maintenance of present facilities will be accomplished to continue present research programs under current budget trends.

Environmental Effects

The environmental effects of this Alternative--physical-biological, economic, and social--are summarized on the following pages. For a more detailed description of these effects, see chapter 4.

Physical-Biological Effects

Under Alternative 5, water quality goals would be met with small increases in yield over the present condition. Air quality would not significantly change over current conditions. Visual quality would be moderately impacted in the short term as a result of changes in color and texture of the forest landscape but these impacts would decrease in the long term. Populations of most endangered and threatened species as well as other species would be maintained; some would decline; very few would be enhanced. Cultural resource impacts of this Alternative would remain at the current level.

Economic Effects

The present net worth for the total National Forest System Alternative 5 over the 50-year period is \$46.5 billion discounted at 7-1/8 percent (table 3.20).

Timber and water provide the largest net benefits. Together these elements account for over 63 percent of present net worth. Recreation, minerals, wildlife and fish also have large positive values.

Table 3.20--NFS present net worth for Alternative 5
discounted at 7-1/8 percent by resource element & region

(Million Dollars)

ELEMENT	NFS REGIONS										TOTAL BY ELEMENT
	1	2	3	4	5	6	8	9	10		
Recreation	128	1,013	423	561	2,817	743	1,320	809	152	7,966	
Wilderness	75	475	79	184	491	77	-9	182	0	1,554	
Wildlife & Fish	176	650	442	485	247	473	289	333	148	3,243	
Range	46	81	34	-51	11	-2	2	-7	--	114	
Timber	15	-294	41	-55	3,640	14,506	555	-442	-551	17,415	
Water	4,161	1,296	140	1,798	1,296	1,535	265	66	1,356	11,913	
Minerals 1/	249	1,435	376	1,264	5	-44	75	297	593	4,250	
Total by Region	4,850	4,656	1,535	4,186	8,507	17,288	2,497	1,238	1,698	46,455	

~~1/ Value for locatable materials other than uranium and thorium was not determined. This primarily impacts the values in Region 5.~~

Alternative 5 yields positive values for each Region. The Pacific Coast Regions (Regions 6 and 5) contribute over 55 percent of the present net worth (37 and 18 percent, respectively).

All Regions have positive values for water, recreation, and wildlife and fish. Region 1 of the Rocky Mountains contributes over 35 percent of the water value. Also, the Pacific Southwest Region (Region 5), and the South (Region 8) contribute 53 percent of the recreation resource element values (35 and 18 percent, respectively).

Timber in the Pacific Coast Regions (Regions 6 and 5) contributes significantly toward the national present net worth. However, Regions 2 and 4 of the Rocky Mountains, the North (Region 9), and Alaska (Region 10) have negative values for timber.

The southern portion of the Rocky Mountains (Regions 2, 3, and 4) contributes 73 percent of the mineral present net worth (34, 9, and 30 percent, respectively) from energy related minerals.

Returns to Government.--Returns to government expected from gross sales (or lease) of National Forest System resources for Alternative 5 are \$1,676 million in 1981, \$2,132 million in 1985, \$2,894 million in 1995, and \$5,446 million in 2025.

These returns include cash payments, required deposits from purchasers to finance activities resulting from timber sales, (such as Knutson-Vandenberg deposits), and credits allowed for work performed by the purchasers.

The Alternative 5 annual revenues (returns to government, in either dollars or credits) are as follows:

(Million Dollars)				
Activity	1981	1985	1995	2025
Recreation	18	20	23	25
Grazing	24	18	20	22
Timber	1,475	1,819	2,376	4,434
Minerals, NFF <u>1/</u>	<u>21</u>	<u>30</u>	<u>42</u>	<u>74</u>
Total NFF <u>2/</u>	1,538	1,887	2,461	4,555
Minerals, BLM <u>3/</u>	<u>138</u>	<u>245</u>	<u>433</u>	<u>891</u>
Total Government	1,676	2,132	2,894	5,446

1/ (NFF) National Forest Fund.

2/ Historically, approximately 25 percent of the National Forest receipts have been paid to States for redistribution to local county governments. Payments are also made by BLM. These payments are in lieu of taxes.

3/ Mineral royalties collected from public domain National Forest System lands and reported by Bureau of Land Management.

Social Effects

The effects of Alternative 5 on the existing social structure would be the least significant of any Alternatives. The overall magnitude of effects nationally would be insignificant. Nonmetropolitan and metropolitan areas dependent on existing Forest Service program outputs and services could count on no major changes. These areas are generally in the West and Southeast. None of the key social variables would be affected, but opportunities for desired changes or shifts would be more limited. Effects from Alternative 5 in areas where rapid growth rates are occurring would be negligible.

Alternative 5 was considered to be very desirable in terms of "futures foregone." Very little "conflict polarization" resulted from this Alternative. (See chapter 4 for definitions.)

PART B

OTHER ALTERNATIVES CONSIDERED IN RESPONSE TO PUBLIC COMMENT

Many of the public comments received amounted to proposals for consideration of additional alternatives. They were for the most part modifications and combinations of the original five alternatives. A few of these most often mentioned are described as follows

One called for moderate market and high nonmarket outputs from the National Forest System, high market and nonmarket emphasis on State and Private Forestry programs, and high research and Human Resource program.

A second proposed that an alternative be designed with mixes of high market outputs and low to moderate nonmarket outputs.

A third modification would combine moderate market and nonmarket emphasis on National Forests with high State and Private Forestry, Research, and Human Resource program emphasis.

In response to these suggestions, a modified alternative was developed to show how parts of the original alternatives in many cases were or could be reorganized for evaluation. This modified alternative is presented here in detail as an example.

ALTERNATIVE 4a

Alternative 4a, designated as such because of its similarity to Alternative Program Direction 4, was constructed in response to those who desired the Forest Service to analyze an alternative which would:

- Maintain or slightly increase commodity outputs over time through more intensive management on the most productive lands.
- Contain the greatest opportunity for Wilderness designation and dispersed recreation practicable.
- Give greater emphasis to Wildlife and other non-commodity outputs.
- Expand State and Private Forestry activities.
- Expand the Forest Service Research program.

Alternative 4a emphasizes nonmarket outputs such as dispersed recreation and wildlife habitat in much the same manner as Alternative 4. Also like Alternative 4, it provides for maximum wilderness acreage. A significant difference is that Alternative 4 projects decreases in timber and grazing outputs whereas Alternative 4a does not. The decreases in market outputs made Alternative 4 unacceptable to many people.

Under Alternative 4a, the impacts of a higher production of nonmarket outputs on market outputs are partially offset by more intensively managing the accessible portions of the National Forests. Groups proposing this Alternative suggested that timber production could be maintained or even

increased by reallocating funds which would have been used for developing roadless areas to more intensively managing the roaded areas.

A 1978 study by the Forest Service 1/ examined several National Forests in detail to study a proposal similar to Alternative 4a. "The harvest that could be programmed in the first decade with all the roadless area in the land base could not be achieved on any study forest with all of the roadless area withdrawn through reallocation of costs savings to more intensive timber management. With one-half of the roadless area withdrawn, the base programmed harvest could be achieved through reallocation on only one" of seven study forests. With half or all of the roadless area withdrawn, funds for intensive timber management are generally not the constraint. Instead, timber production was limited by needs to protect environmental and multiple use values.

Program in Brief

National Forests

Using the existing elements presented in Part A of this Chapter, the level of management and outputs for each of the elements would approximate the Alternative Program Direction mix in table 3.21 for the National Forest System.

In this Alternative, recreation, wilderness, and wildlife and fish are held at the Alternative 4 level in all Regions. This is the high noncommodity use Alternative. The remaining resource elements are kept at levels which allow outputs to increase slightly over time, yet generally still complement the noncommodity elements. Environmental conflicts would probably increase as a result of a smaller land base from which to obtain market outputs, but the mix as shown in table 3.21 appears to be viable. However, there is uncertainty in meeting the timber production goals on the National Forests in Oregon and Washington if conflicts between resource outputs during the forest planning process are resolved to favor noncommodity outputs. The support elements (protection, lands, soils and facilities) were assigned an alternative level for each Region. The level assigned was designed to produce the activities and outputs which would be required by the mix of resource elements in each Region.

State and Private Forestry

State and Private Forestry Programs would be at Alternative 4 level in all Regions and Areas. Technical and financial assistance would be expanded and would emphasize both market and nonmarket objectives.

1/ Roadless Area--Intensive Management tradeoff on Western National Forests, revised Oct. 1978, Western Resource Policy Economics Research, USDA Forest Service.

Table 3.21--Alternative 4a (public involvement).Alternative Program Directions in Terms of Draft Alternatives

Region --	1	2	3	4	5	6	8	9	10
Recreation	4	4	4	4	4	4	4	4	4
Wilderness	4	4	4	4	4	4	4	4	4
Wildlife & Fish	4	4	4	4	4	4	4	4	4
Range	5	5	5	5	5	5	5	5	N/A
Timber	3	4	5	4	5	5	1	5	2
Water	3	4	4	4	4	5	1	5	4
Minerals	3	3	3	3	3	3	3	3	3
Human and Community Development	3	3	3	3	3	3	3	3	3
Protection	3	4	4	4	4	5	1	5	4
Lands	3	4	4	3	3	3	3	4	4
Soils	3	4	4	4	4	5	1	5	4
Facilities	3	3	3	3	3	3	3	3	3

Research

Forestry Research would be at Alternative 3 level, which would be an increased program in line with the national and regional programs of Research. Programs would be expanded to provide a more adequate scientific basis for environmental decisions and programs on National Forest System, State and private lands. Emphasis would be given to seeking technology and methodology needed to resolve resource management conflicts resulting from intensive management on a reduced land base.

Human Resource Development

Emphasis would continue on involvement on discrete human and community development efforts that complement the activities in other Forest Service resource systems.

Summary of Program Outputs, Activities, and Costs

Under Alternative 4a, recreation opportunities on the National Forest System would double by 2025, with the increase spread equally between developed and dispersed activities. Developed use would go from 80 million visitor days in 1978 to 157 million in 2025, and dispersed use would expand from 130 million to 250 million visitor days during the same period. This does not include wilderness use. Cooperative assistance would increase significantly to promote optimum capabilities for high quality outdoor recreation.

Wilderness acreage would increase to over 47 million acres.

Wildlife habitat improvement on the National Forest System would increase from 2.3 million acre-equivalents in 1978 to 3.6 million in 1985. Anadromous fish habitat improvements would increase the annual contribution of the National Forests to the commercial salmon fishery by 3.8 million pounds in 1985 and 25.5 million pounds in 2005 through 2025. Cooperative assistance for wildlife and fish habitat improvement on non-Federal public forest lands would be significantly increased.

Livestock grazing on the National Forest System would approximate current levels, increasing only slightly from the present 9.9 million animal-unit-months to approximately 10.8 million in 2025. Cooperative assistance for forage production on non-Federal forested ranges would be greatly expanded.

National Grassland management would emphasize use of the Federal land to demonstrate sound and practical principles of land use and to exert a favorable influence for securing sound land conservation practices on associated private lands to help meet both market and nonmarket objectives on the private lands.

Timber sale offerings from the National Forest System would increase from 12.2 billion board feet in 1978 to 15.1 billion by 2025. Annual reforestation would increase from 402,000 acres in 1988 to 457,000 by 2025. Cooperative assistance programs would be increased significantly and would include proper sale, harvest and processing techniques, as well as increased and improved timber growth.

Water quantity would increase slightly, and the percentage of water meeting water quality goals would increase. Cooperative assistance for protecting and improving the quality, quantity, and timing of water yields from non-Federal forest lands would increase significantly.

Efforts would be moderately increased to accommodate all requests to prospect, develop, and remove mineral resources from National Forest System lands in compliance with all applicable laws. The number of applications for leases and permits is expected to increase from 17,900 in 1981 to 35,400 by 2030. Cooperative assistance to State forestry agencies for reclamation of surface mined lands would be accelerated.

Research would emphasize production of knowledge and technology needed to manage all resources on both public and private forest and rangelands.

Research requirements to support these needs are described in the Regional and National Programs for Research. 1/

Human and Community Development programs on the National Forest System would be slightly larger than the fiscal year 1978 programs. Both cooperative assistance to States and cities, and research, for urban and community forestry would increase significantly.

The total Forest Service work force, in thousand person-years, necessary to perform the work included in Alternative 4a is as follows:

Base year 1978	1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
44.4	70.6	74.1	75.7	76.5	78.3	72.6	69.9	74.0	76.3	76.3

Table 3.22 displays a national summary of National Forest System projected program outputs, activities, costs, and returns to government for Alternative 4a. Table 3.23 shows comparable data for State and Private Forestry programs. For more details on the S&PF goals, outputs and activities for Alternative 4a, see the S&PF portions of Alternative 4.

Table 3.24 summarizes the Research program.

Figure 3.166 shows costs by program area for Alternative 4a.

1/ U.S. Department of Agriculture, and National Association of State Universities and Land Grant Colleges. National program of research for forests and associated rangelands, August 1978. (Western, North Central, Northeastern and Southern Region publications; August 1979.)

Table 3.22--Projected National Forest System program outputs, activities, and costs ^{1/}

Alternative 4a

PROGRAM ELEMENT AND OUTPUT/ACTIVITY	UNIT OF MEASURE	BASE YEAR 1978	ANNUAL UNITS									
			1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
RECREATION												
Developed Recreation Use (Includes VIS)	Million Recreation Visitor Days	79.6	86.4	91.5	96.3	99.7	103.3	114.6	127.3	137.2	146.0	157.4
Dispersed Recreation Use (Includes Wild- life & Fish)	Million Recreation Visitor Days	130.2	142.5	147.4	153.5	160.2	166.2	180.2	197.2	224.2	244.2	250.1
Trail Construction/ Reconstruction	Miles	600	3400	2300	2200	2200	2100	2200	2300	2400	2500	2600
WILDERNESS												
Wilderness Management	Million Acres	15.3	37.8	40.6	41.7	43.0	45.3	46.9	47.1	47.3	47.5	47.8
WILDLIFE & FISH												
Wildlife Habitat Improvement	Thousand Acre- Equivalents	2330	2860	2840	3030	3270	3570	2900	2480	2230	1550	1480
Anadromous Fish Improvement	Thousand Pounds	--	3	210	581	1680	3750	9680	19600	25500	25500	25500
RANGE												
Grazing Use (Live- stock)	Million Animal- Unit Months	9.9	10.1	10.1	10.1	10.1	10.2	10.0	10.2	10.3	10.5	10.8
TIMBER												
Programmed Sales Offered	Billion Board Feet	12.2	11.7	11.8	11.9	12.0	12.0	12.3	12.8	13.6	14.5	15.1
Reforestation	Thousand Acres	411	442	476	483	489	492	402	414	429	443	457
Timber Stand Improvement	Thousand Acres	420	378	431	426	422	422	326	297	301	305	310
WATER												
Volume Meeting Water Quality Goals	Million Acre Feet	--	401	402	403	405	406	411	416	421	421	421
MINERALS												
Minerals Leases and Permits	Thousand Operating Plans	14.5	17.9	19.9	21.1	22.5	23.7	26.0	28.1	30.8	34.5	35.4
HUMAN & COMMUNITY DEVELOPMENT												
Human Resources Programs 2/	Thousand Enrollee Years	14.8	15.7	18.5	18.5	18.5	18.5	9.6	9.6	9.6	9.6	9.6
PROTECTION												
Fire Management Effectiveness Index	Dollars/ Thousand Acres	1110	1150	1220	1280	1300	1300	1300	1280	1270	1270	1270
Fuelbreaks & Fuel Treatment	Thousand Acres	392	276	305	328	330	333	320	296	310	314	320
LANDS												
Land Purchase and Acouision (Excludes Exchange)	Thousand Acres	117	233	222	219	205	222	371	101	132	163	178
SOILS												
Soil & Water Resource Improvement (Improved Watershed Condition)	Thousand Acres		19.5	21.2	22.7	23.6	24.6	28.1	26.4	20.5	21.0	21.0
FACILITIES												
Road Construction/ Reconstruction (Arterial, Collector)	Miles	690	210	520	590	640	680	840	910	910	870	570
RETURNS TO THE GOVERNMENT												
	Million Dollars		1104	1110	1216	1298	1382	1540	1776	2262	3014	3792
COSTS												
NATIONAL FOREST SYSTEM-												
Operational	Million Dollars	676	3/ 947	1007	1118	1136	1177	1213	1310	1415	1452	1441
Capital Investments 4/	Million Dollars	684	799	849	813	827	856	715	770	810	832	825
Backlog 5/	Million Dollars	61	47	50	40	41	43	32	31	--	--	--
Total Appropriated 6/	Million Dollars	1421	1793	1906	1971	2004	2076	1960	2111	2225	2284	2266
Allocated Funds 7/	Million Dollars	244	367	368	370	372	374	270	3	3	3	3
Total NFS	Million Dollars	1665	2160	2274	2341	2376	2450	2230	2114	2228	2287	2259

^{1/} All costs and returns are shown in constant 1978 dollars.

^{2/} Human Resource Programs whose funds are allocated to the Forest Service are not included in figures beyond 1985.

^{3/} The 1978 base year figure has been adjusted upward in order to include the effect of the revised fire financing policy which calls for full funding of presuppression activities instead of relying on supplemental appropriations. The amount of the adjustment (92.4) is from the 1979 President's Budget.

^{4/} NFS capital investments are such things as: sale preparation--live volume; TSI/reforestation; range structural improvements, road and trail construction/reconstruction; wildlife and fish habitat improvement; developed recreation site construction; water and soil resource improvements; and fuel treatments.

^{5/} Backlog costs are shown here for information only and are included in capital investment costs.

^{6/} Total appropriated costs are the sum of operational and capital investment costs. NFS appropriated funds include all YCC and Cooperator Funds.

^{7/} NFS allocated costs include YACC and other human resource programs, O&C Grants, Land and Water Conservation, and other funds. Costs exclude payments to States and Counties, and Federal Highway Funds.

Abbreviations used: AUM = animal unit month; RVD = recreation visitor day.

Table 3.23--Projected State & Private Forestry program outputs, activities,
and costs 1/

Alternative 4a

PROGRAM ELEMENT AND OUTPUT/ACTIVITY	UNIT OF MEASURE	BASE YEAR 1978	ANNUAL UNITS									
			1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
RECREATION												
Technical Assistance for Dispersed Recreation	Thousand Acres	81	299	313	344	371	395	440	553	587	625	647
WILDLIFE & FISH												
Technical Assistance for Wildlife Habitat Improvement	Thousand Acres	170	856	940	1030	1110	1170	1290	1590	1660	1720	1770
RANGE												
Technical Assistance for Range Improvement	Thousand Acres	50	187	208	243	269	290	337	447	486	528	558
TIMBER												
Reforestation (RFA, FIP, ACP)	Thousand Acres	326	852	949	1030	1120	1230	1250	1310	1450	1580	1690
Timber Stand Improve- ment (RFA, FIP, ACP)	Thousand Acres	275	666	669	720	746	776	866	1080	1260	1410	1540
Timber Prepared for Harvest	Million Cubic Feet (MMCF)	225	341	366	379	393	405	463	564	630	691	739
Woodland Owners Assisted	Thousand Owners	165	249	262	290	298	303	344	365	462	507	543
Improved Wood Utilization	Million Cubic Feet (MMCF)	164	242	246	251	256	260	261	302	317	335	351
HUMAN AND COMMUNITY DEVELOPMENT												
Urban and Community Forestry	Thousand Urban Areas	7.0	3.5	4.7	5.9	6.7	7.5	8.0	9.1	9.4	9.4	9.4
PROTECTION												
Insect and Disease Surveys	Million Acres	600	474	519	566	614	660	672	689	712	717	902
Rural Community Fire Protection	Thousand Approved Applications	3.0	4.3	4.7	5.0	5.4	5.5	5.6	5.8	6.0	6.3	6.6
Fire Loss on Pro- tected Area	Thousand Acres Burned	1700 2/	1450	1410	1400	1380	1340	1290	1190	1070	963	870
WATER, MINERALS, LANDS, AND SOILS												
State Forest Resource Planning	Million Acres	--	201	144	210	178	182	211	218	219	219	224
Landowner Forest Management Plans	Million Acres	3.2	4.3	4.6	4.8	4.9	5.5	5.7	6.2	9.2	11.4	13.5
Cooperative Technical Assistance	Person Years	--	76	79	82	87	93	85	90	104	103	78
COSTS												
STATE AND PRIVATE FORESTRY-												
Operational	Million Dollars	30	55	68	68	68	68	87	84	89	93	97
Capital Investments 3/	Million Dollars	50	91	106	106	106	106	109	123	132	134	139
Total Appropriated 4/	Million Dollars	80	146	174	174	174	174	196	207	221	227	236
Allocated 5/	Million Dollars	37	79	93	93	93	93	82	89	92	99	104
Total S&PF	Million Dollars	117	225	267	267	267	267	278	296	313	326	340

1/ All costs are shown in constant 1978 dollars.

2/ S&PF-Cooperative Fire Loss base figure is calendar year 1977.

3/ S&PF capital investments include such activities as: reforestation; timber stand improvement; preparation of landowner forest management plans; cooperative forest resource planning; insect and disease surveys; and fire management planning and fuel treatment.

4/ Projected estimates of funds appropriated to the Forest Service for cooperative forestry assistance under P.L. 95-313.

5/ Projected estimates of funds appropriated to other USOA agencies for programs which receive assistance from the Forest Service and State forestry agencies, including (1) forestry practices under the Agriculture Conservation Program and the Forestry Incentives Program funded through the Agricultural Stabilization and Conservation Service; (2) Rural community fire protection funded through the Farmers Home Administration; and (3) funds allocated to the Forest Service by the Soil Conservation Service for the forestry aspects of watershed planning, flood prevention, river basin surveys and investigations, and resource conservation and development.

Alternative 4a, as stated earlier, includes Research at the Alternative Program Direction 3 level. For the reader's convenience, the Alternative 3 Research Program Summary is repeated below. For a more detailed explanation of the Research goals, outputs, and activities under Alternative 4a, please refer to the Research sections of Alternative Program Direction 3.

Table 3.24.--Planned research program activities and costs

Alternative 4a

FOREST RECREATION RESEARCH	Moderate increases in knowledge to assess and predict recreation demand and protect resources.
WILDERNESS RESEARCH	Moderate increase in knowledge to manage and protect wilderness and unique ecological features.
WILDLIFE, FISH, AND PLANT HABITAT RESEARCH	More scientific knowledge of threatened and endangered species and species of high demand and their habitats.
RANGE RESEARCH	Increased knowledge of natural range ecosystems for livestock production that is energy efficient.
TIMBER MANAGEMENT RESEARCH	Increased knowledge of regeneration and intensive culture on best sites alternative management systems for private ownerships.
FOREST PRODUCTS UTILIZATION RESEARCH	Increased knowledge of wood for energy and biomass use, complete tree use, structural design, and hardwood products.
FOREST ENGINEERING RESEARCH	Increased knowledge of harvesting wood for energy and solid products, and better engineering of energy farms.
WATER RESOURCE RESEARCH	Increased knowledge to provide on-site quality and quantity, off-site yields and eliminate pollutants.
SURFACE ENVIRONMENT AND MINING (SEAM) RESEARCH	Increased knowledge to maintain mine area streamflow quality, recreation, wildlife habitat, range and timber productivity.
URBAN AND COMMUNITY FORESTRY RESEARCH	Moderate increases in knowledge to assess urban forest benefits, understand urban forest process and protect and integrate forests into urban planning.
FIRES AND ATMOSPHERIC SCIENCES RESEARCH	Increased knowledge of new improved fire management systems and impacts of fire on the environment.
FOREST INSECT AND DISEASE RESEARCH	Increase number of impact assessment techniques and insect and disease management systems.
RENEWABLE RESOURCES ECONOMIC RESEARCH	Improved economic analyses of multiresource management alternatives on all forest and range lands.
RENEWABLE RESOURCES EVALUATION RESEARCH	Inventories and analyses of all renewable resources on a 10-year cycle.
SOIL MANAGEMENT RESEARCH	Increased knowledge of soil resources for recreation, wildlife habitat and increased timber and range production on selected sites.

	1970	BASE YEAR 1978	AVERAGE ANNUAL COSTS									
			1981	1982	1983	1984	1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
COSTS												
RESEARCH-												
Operational ^{1/}		105.8	154.2	158.0	161.8	165.6	169.4	187.2	206.4	224.4	239.1	251.6
Capital Investments ^{2/}		2.7	32.9	25.7	18.4	11.2	3.9	4.2	1.9	2.1	4.6	6.4
Total Research	76.4	108.5	187.1	183.7	180.2	176.8	173.3	191.4	208.3	226.3	243.7	258.0

^{1/} Research program costs only. YCC, YACC, and other Human Resource Programs are included with NFS.

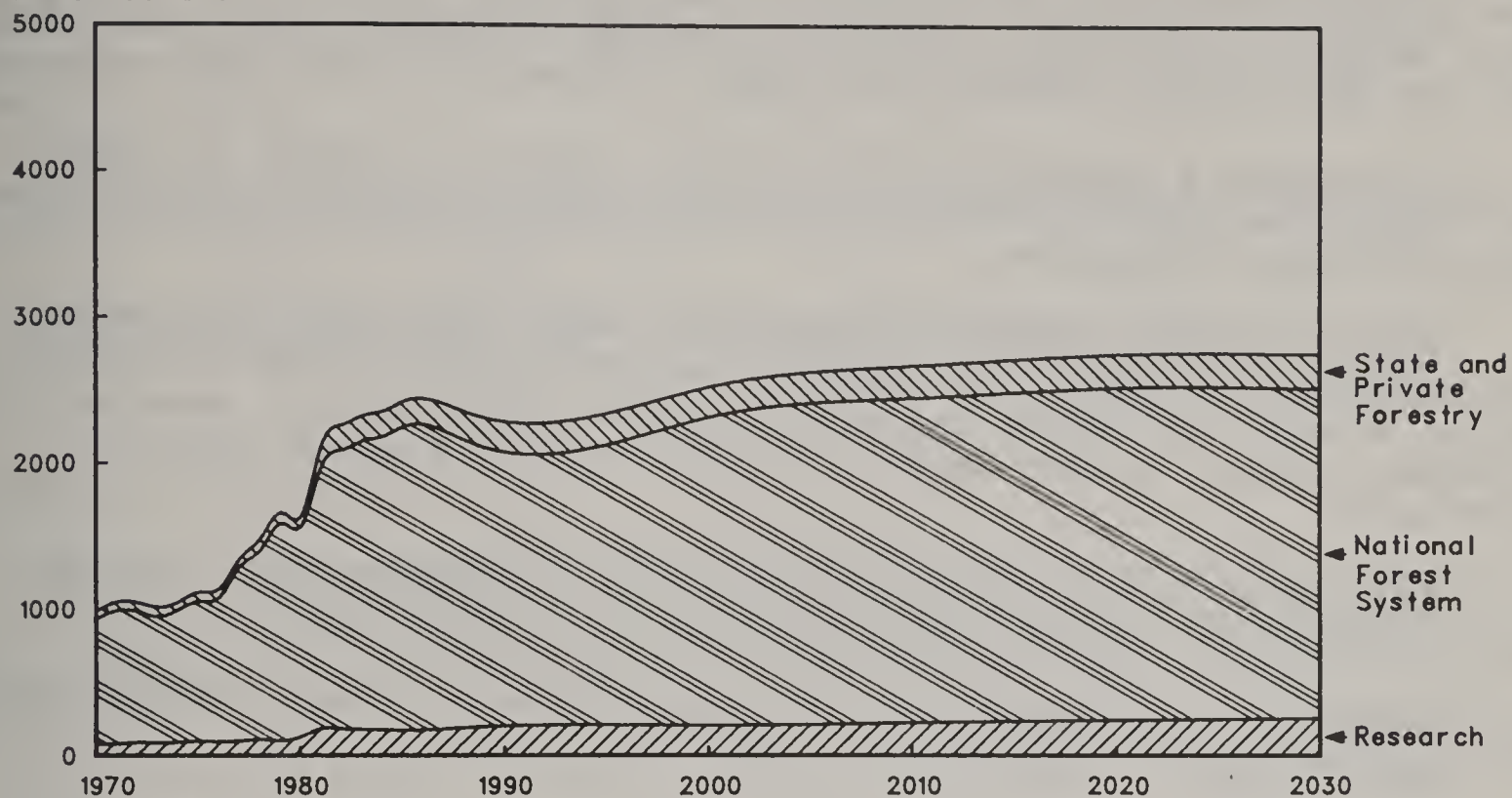
^{2/} Research construction.

^{3/} All costs are in 1978 dollars.

Figure 3.166

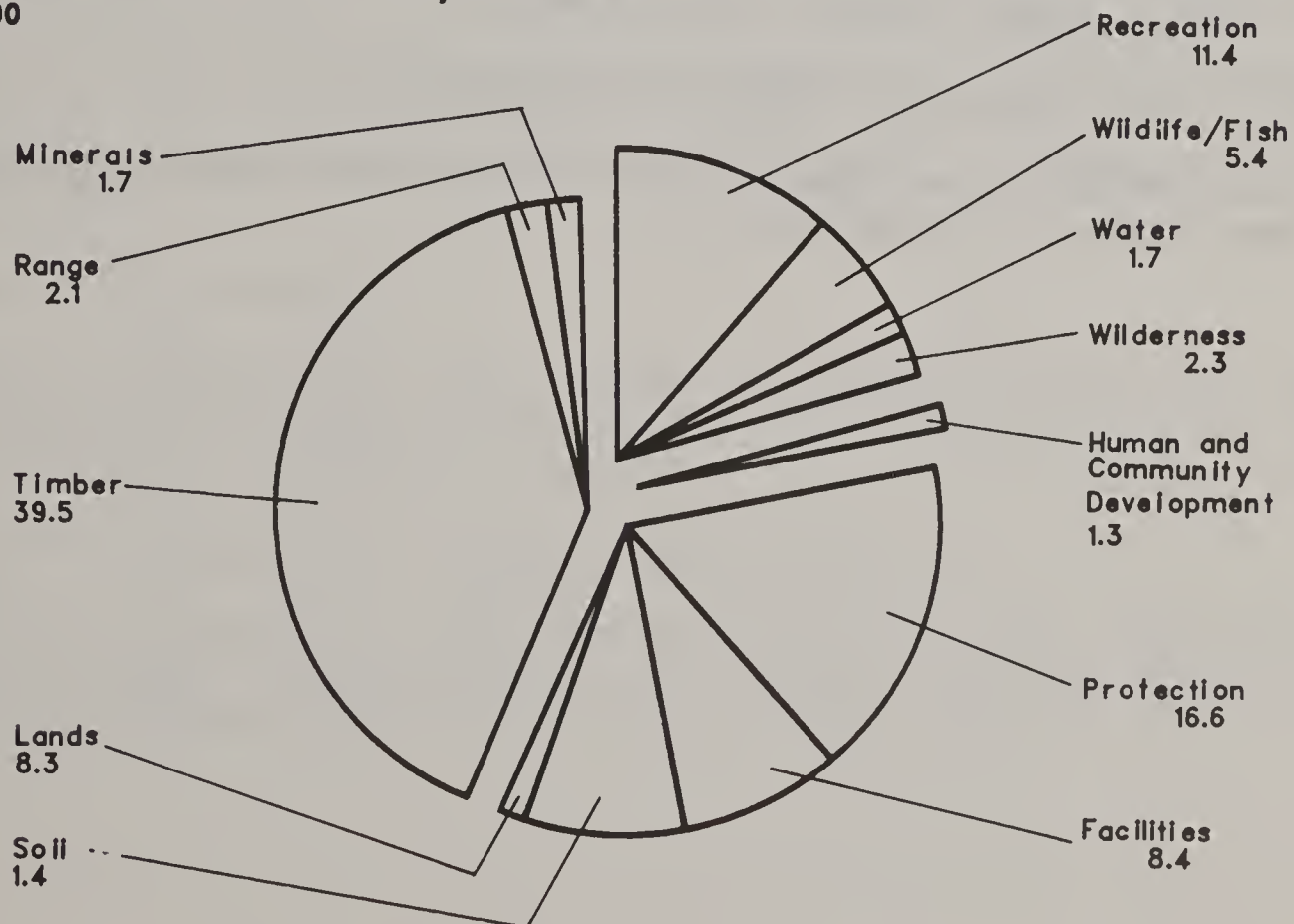
Program Cost-Alternative 4a

Million Dollars



Appropriated Funds Only
Excludes Allocated Fund Estimates

Alternative 4a Percent of Total Cost by Element 1991 - 2000



THE DETAILS

This section presents Forest Service programs for Alternative 4a for only those resource elements which differ by Alternative Program Direction (APD) by Region. Rather than duplicate material found in the earlier five Alternatives, the reader is referred to the appropriate APD for the national goals, outputs, activities, and figures for the recreation, wilderness, wildlife and fish, range, minerals, and human and community development elements.

The Resource Elements displayed in this section are timber and water. The Alternative Program Direction for these elements varies by Region, necessitating further discussion.

The four support elements (protection, lands, soils, and facilities) are displayed also since most have been assigned different APD levels by Region, in order to include the support outputs and activities necessary for a balanced program in each Region. Outputs from all elements appear in table 3.21.

State and Private Forestry goals, outputs, activities, and costs in Alternative 4a are identical with all S&PF data in Alternative 4.

Research program details for Alternative 4a are identical with Research data presented in Alternative 3.

NFS National Goals, Outputs and Activities

Recreation--Same as recreation element, Alternative 4.

Wilderness--Same as wilderness element, Alternative 4.

Wildlife and fish--Same as wildlife and fish element, Alternative 4.

Range--Same as range element, Alternative 5.

Minerals--Same as minerals element, Alternative 3.

Human and Community Development--Same as human and community development element, Alternative 3.

Timber

National Goals

Timber supply, NFS.--Increase total timber supply from the National Forests at a moderate rate by intensively managing for timber production on a commercial land base reduced to favor maximum production of non-commodity outputs.

Silvicultural practices, NFS.--Intensify application of silvicultural practices on commercial forest land.

Wood utilization, NFS.--Make full use of available wood fiber from harvested and treated areas to meet output goals on a reduced land base.

Outputs and Activities

National Forest System.--Annual timber sale offerings would expand from 12.2 billion board feet local scale in 1978 to 15.1 billion board feet in 2025 (figure 3.167). Harvesting, including regeneration and intermediate and salvage harvests, would be extended to all available commercial forest lands allocated to timber production consistent with the high wilderness and recreation objectives of this Alternative. Harvests of overmature timber stands would be accelerated within sustained yield principles to increase effective growth. Strict stocking and species control of all commercial timber stands would be maintained. Annual reforestation would increase to 402,000 acres in 1988 and to 457,000 acres by 2025 (figure 3.168). Approximately 459,000 acres of the reforestation backlog would be treated by 1985, consistent with the wilderness, recreation, and timber production goals of the Alternative. Timber stand improvement would be decreased nationally (figure 3.169). Timber management intensity would be increased to highest feasible levels on the available commercial land base reduced to accommodate noncommodity outputs in the western Regions. The timber production goals on the National Forests of Washington and Oregon might not be feasible if conflicts between resource outputs during the forest planning process were resolved to favor noncommodity outputs. Emphasis on increasing timber production would change from the Pacific Coast to the Northern Rocky Mountains with Region 1 doubling current production by 2025.

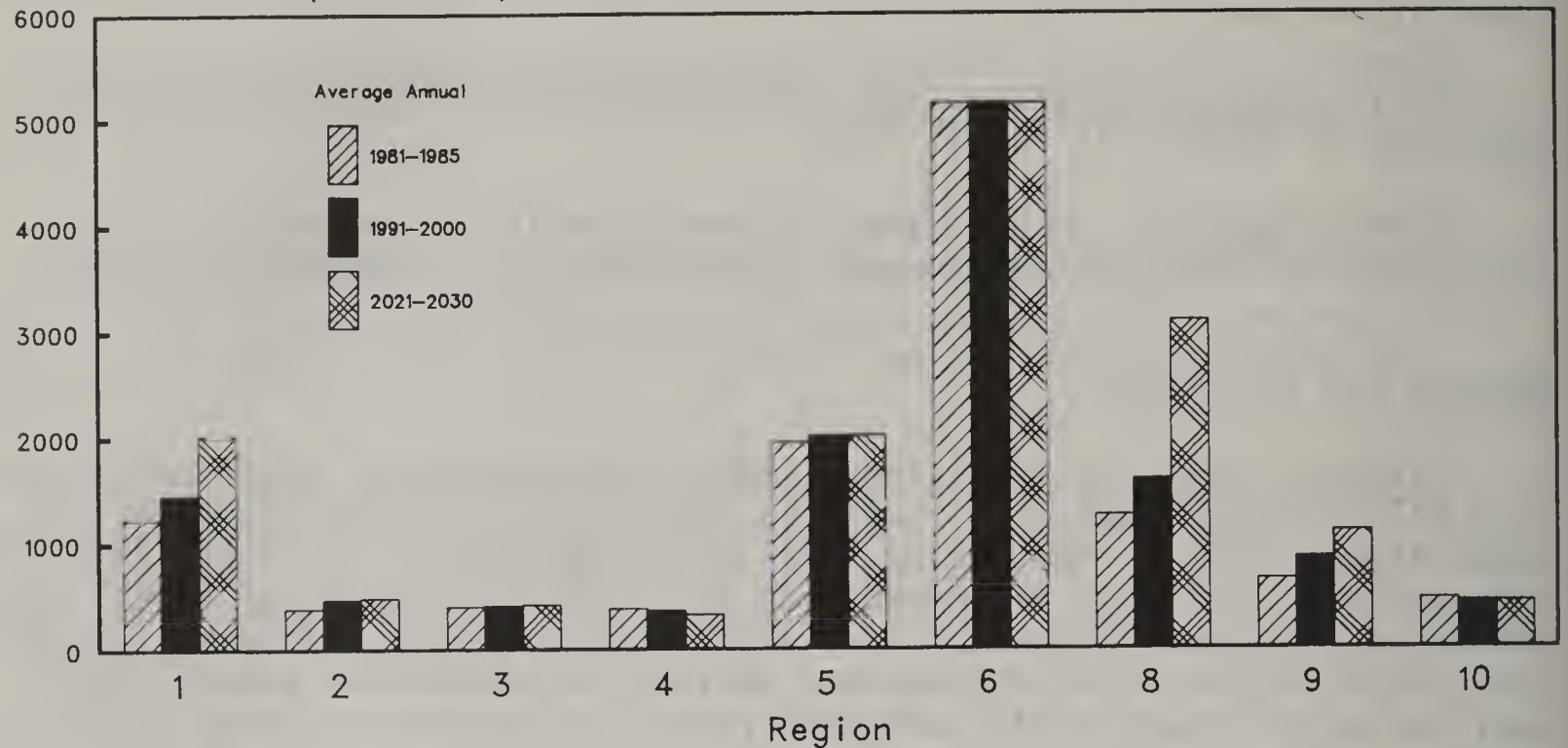
For NFS, this Alternative:

- Reduces availability of wood residues for energy, as the high production goals on a reduced land base will increase competition for raw materials for conventional products.
- Supports RPA goals to increase softwood production.
- May not be feasible if herbicide use is not permitted. The Forest land management planning process will have to determine feasibility on a case-by-case basis.

Figure 3.167

Regional Estimates-Alternative 4a Programmed Sales Offered (NFS)

Million Board Feet (Local Scale)

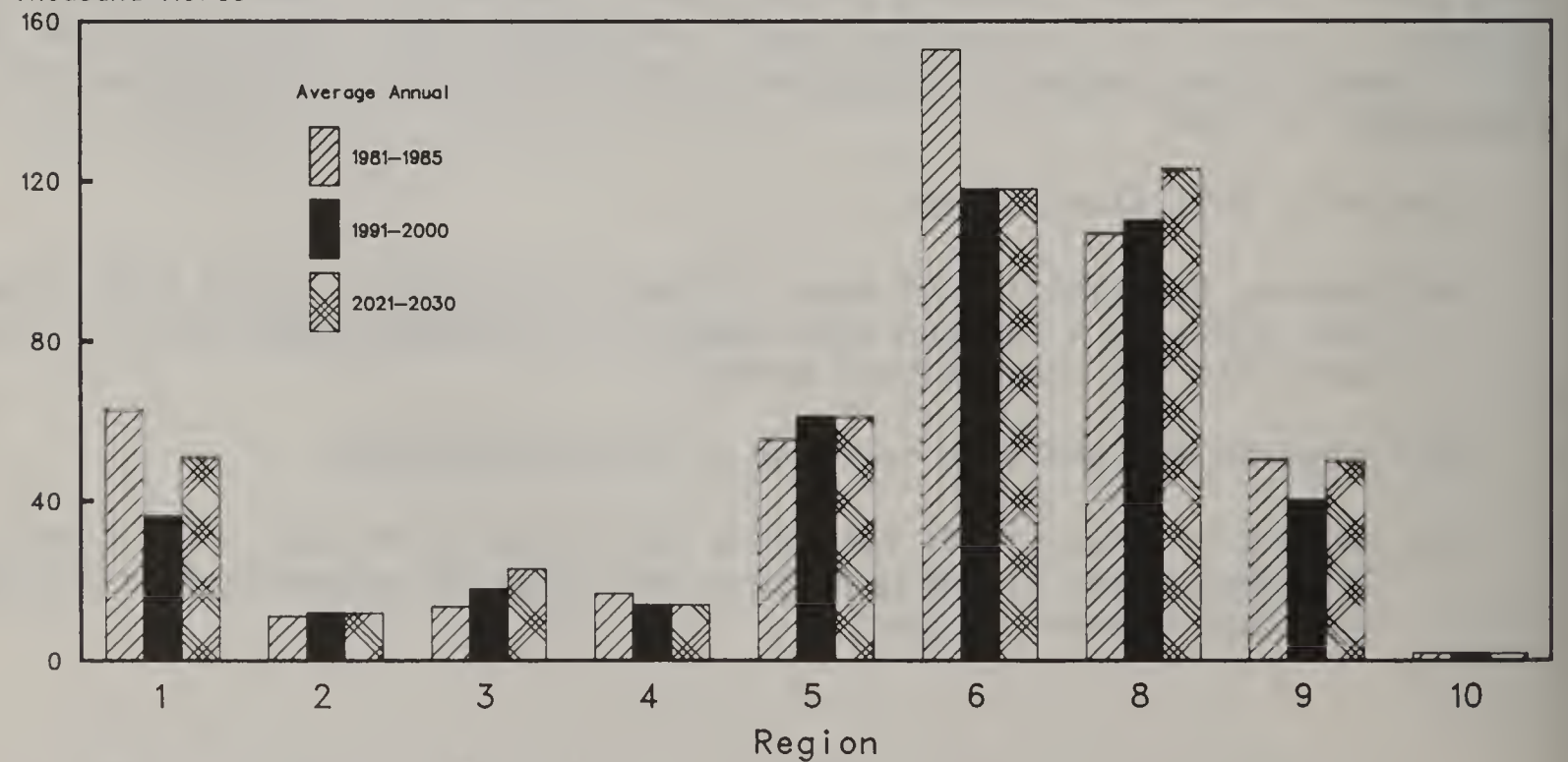


Includes Live and Mortality; Hardwood and Softwood

Figure 3.168

Regional Estimates-Alternative 4a Reforestation (NFS)

Thousand Acres

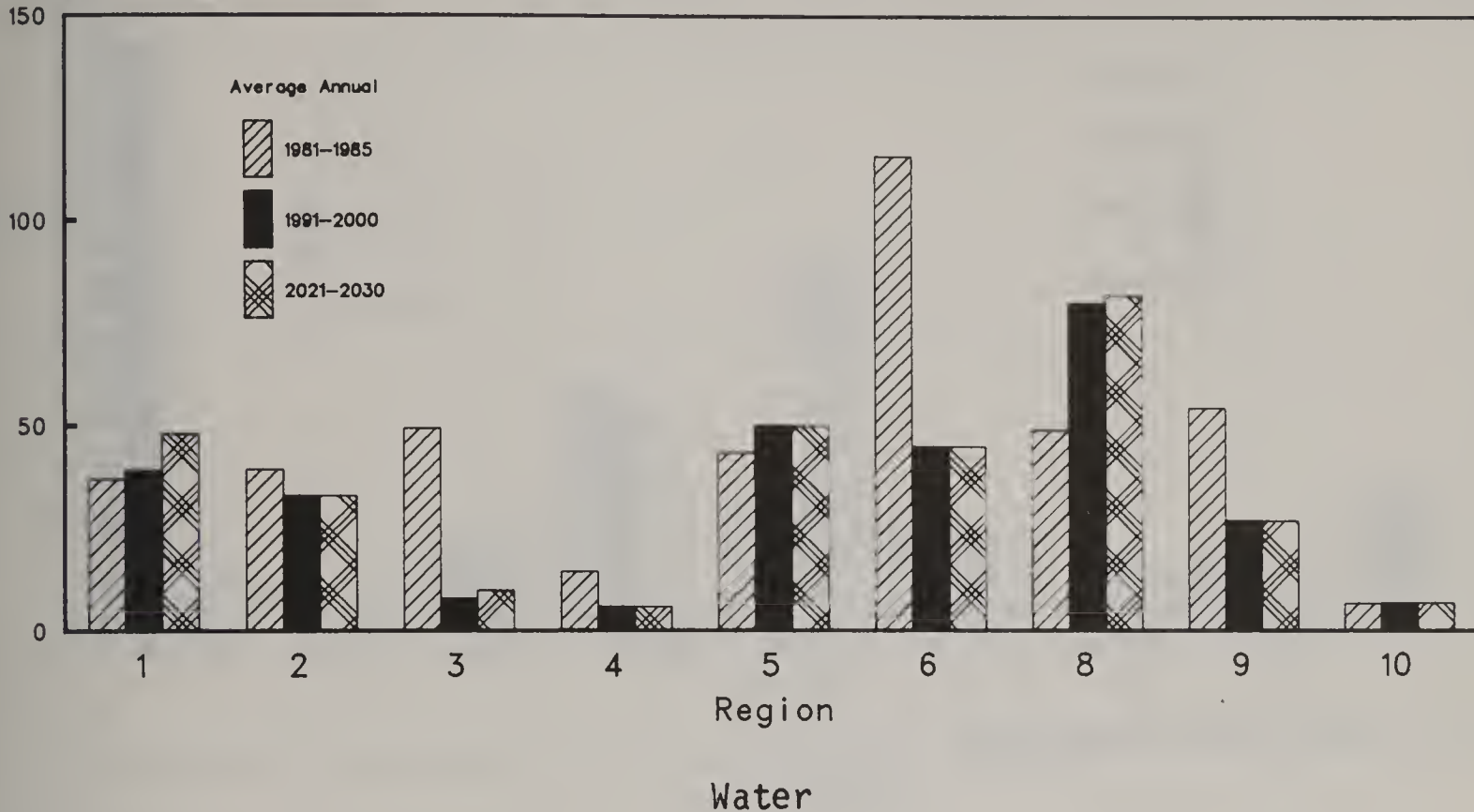


Includes KV and Appropriated Funds

Figure 3.169

Regional Estimates-Alternative 4a Timber Stand Improvement (NFS)

Thousand Acres



National Goals

Technical water support services, NFS.--Provide level of technical water support services needed to enhance water quality for recreational and environmental objectives.

Water quality improvement, NFS.--Intensively implement water resource improvements needed to meet recreational and environmental water quality objectives.

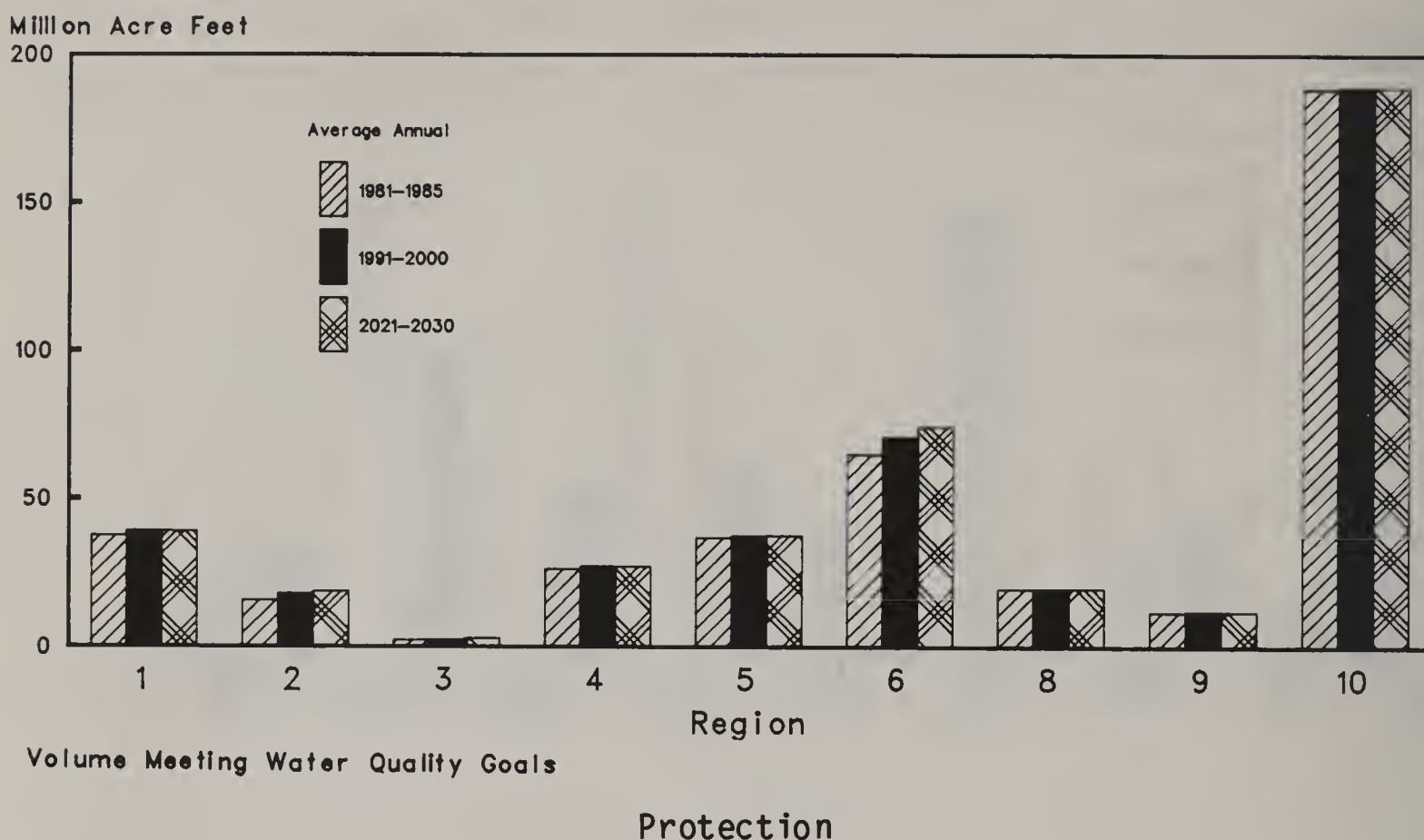
Water yield, NFS.--Limit implementation of water yield improvement practices to those needed to meet nonmarket recreational and environmental objectives.

Outputs and Activities

National Forest System.--Water activities are in addition to the water input to project planning of other elements which are programmed in the benefiting elements. The total inventory, monitoring, data for land management planning, and improvement programs are planned and funded directly in the water element. This program will provide for the inventory and monitoring needed for indicated timber, range, and minerals programs, and is designed to meet requirements of sections 208 and 404 of the Clean Water Act, water rights determination and acquisition programs and water related impacts of NFS land management activities and those imposed by other agencies. The water improvement program includes treatment of degraded areas to improve them to or above their original productivity potential plus improvement of water yield above natural productivity to meet environmental objectives (figure 3.170).

Regional Estimates-Alternative 4a

Water Quality (NFS)



National Goals

Protection, NFS.--Provide insect and disease management, fire use and management, and law enforcement activities, with special emphasis on protection of nonmarket outputs and adjacent private lands.

Air Quality, NFS.--Provide air quality management with emphasis on meeting standards and studying and managing air quality related values.

Outputs and Activities

National Forest System.--Fire protection would be performed at the maintenance level to protect the basic resources, except in areas of high non-marketable values where the protection from and use of fire would be employed to enhance the nonmarketable values. Visual impacts from fuels modification projects would be minimized.

Fire management outputs on NFS lands are reflected in the Fire Management Effectiveness Index--a measure of the cost of protection, plus the net damage per thousand acres protected. Estimates for the nine NFS Regions are shown in figure 3.171. Regional data are shown for fuel breaks and fuel treatment in figure 3.172.

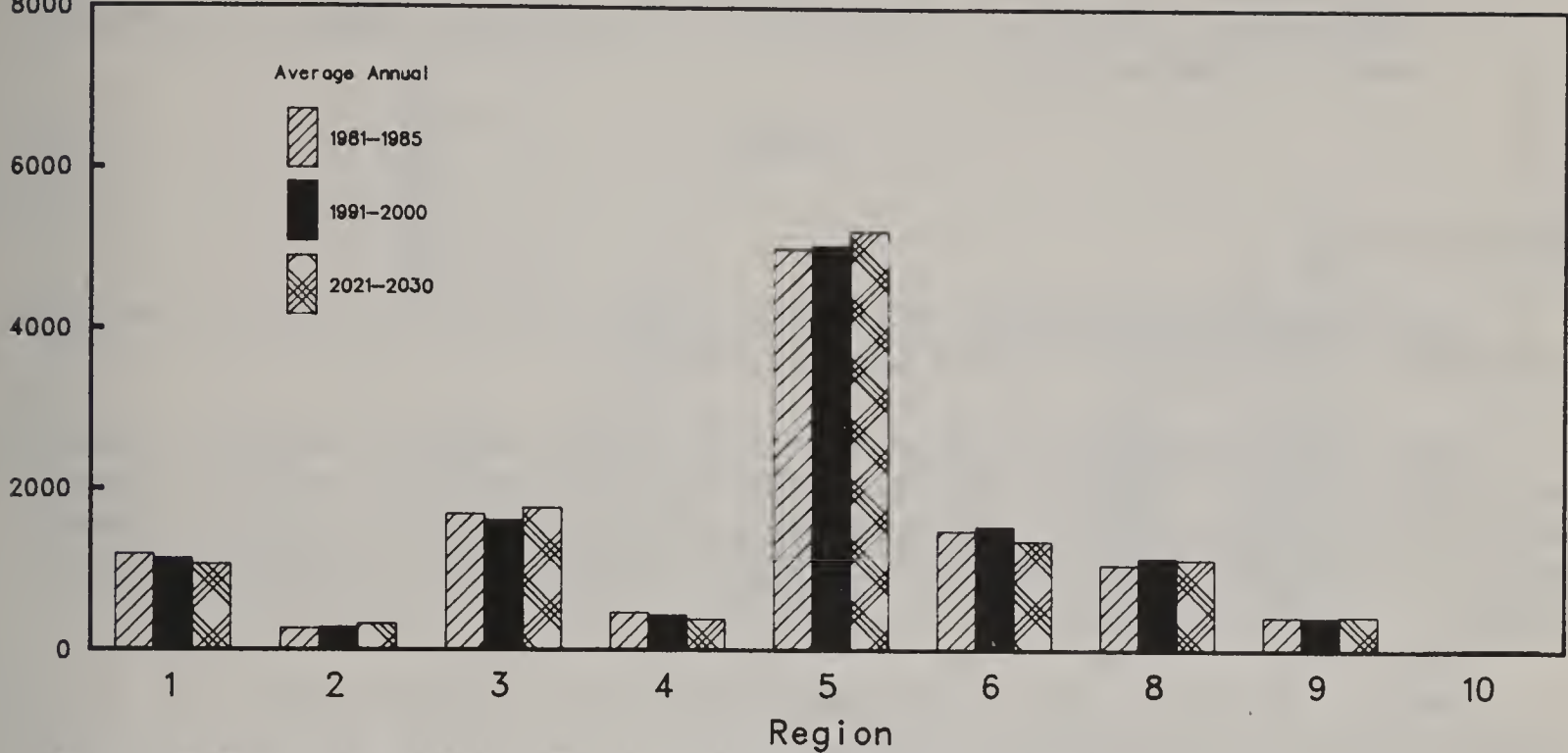
Significant aspects of Alternative 4a:

- The initial index value is low; it climbs gently until planned fuel treatment is completed. Then it declines.

Figure 3.171

Regional Estimates-Alternative 4a Fire Management Effectiveness Index (NFS)

Dollars/Thousand Acres
8000

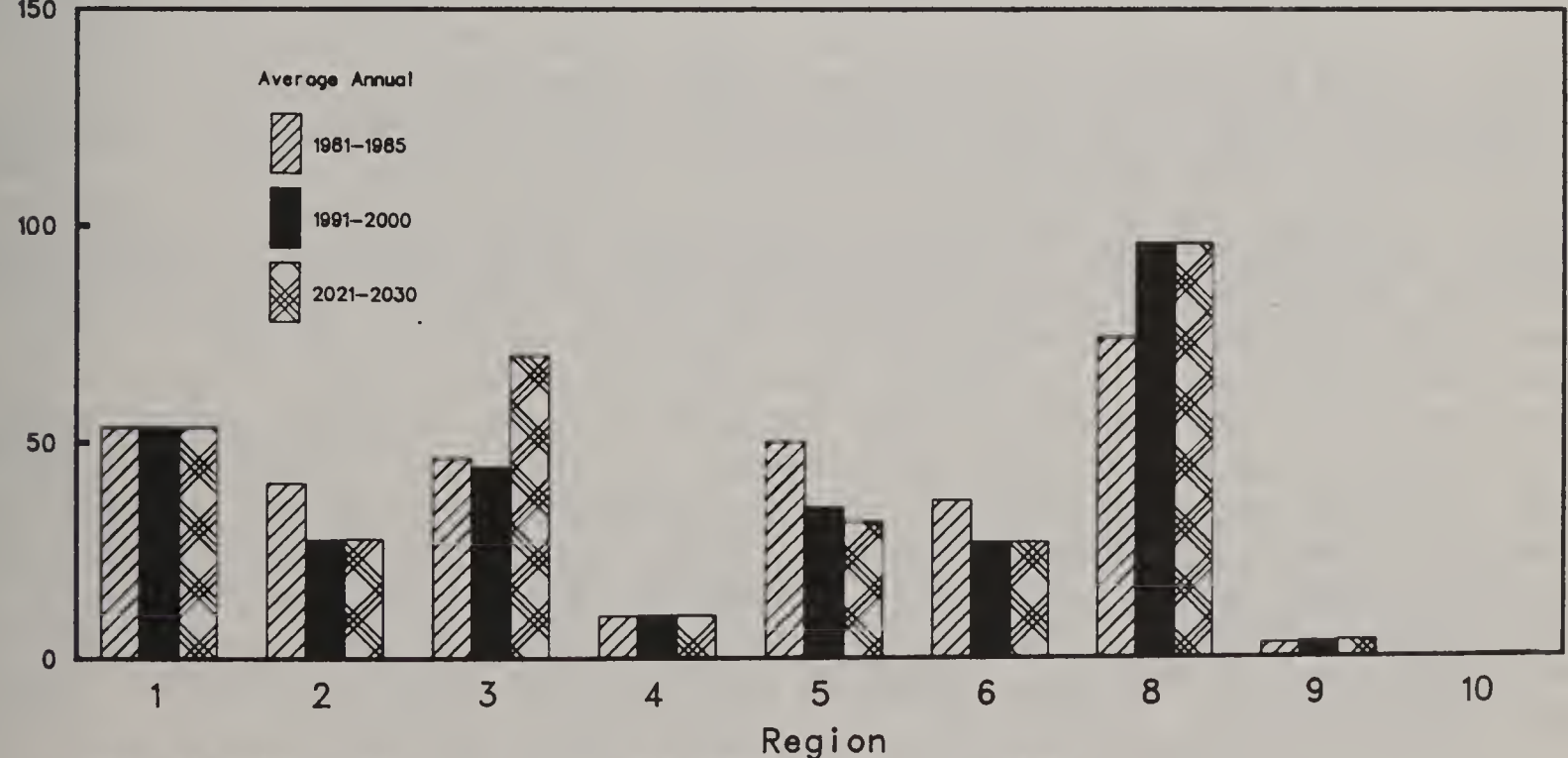


Fire Management Effectiveness Index is a Measure of Cost Plus Loss

Figure 3.172

Regional Estimates-Alternative 4a Fuelbreaks and Fuel Treatment (NFS)

Thousand Acres
150



Includes Fuelbreak Construction and Treatment of Natural Fuels.
Excludes Treatment of Activity Fuels.

- Air quality management is at a high level, with attention directed to protection of nonmarket values.
- Law enforcement would concentrate on the protection of facilities and the safety of the forest users.
- Insect and disease management activities that affect visual impact, recreation, wildlife, wilderness, and human and community development are emphasized.

Lands

National Goals

Land Management Planning, NFS.--Moderately intensify land and resource management planning and related special studies.

Land Status, NFS.--Provide a moderately high level of landline location and marking, title claims, land exchanges and acquisition. Maintain land status data systems records to meet management planning and program commitments. Facilitate early completion of Native and State land selection in Alaska.

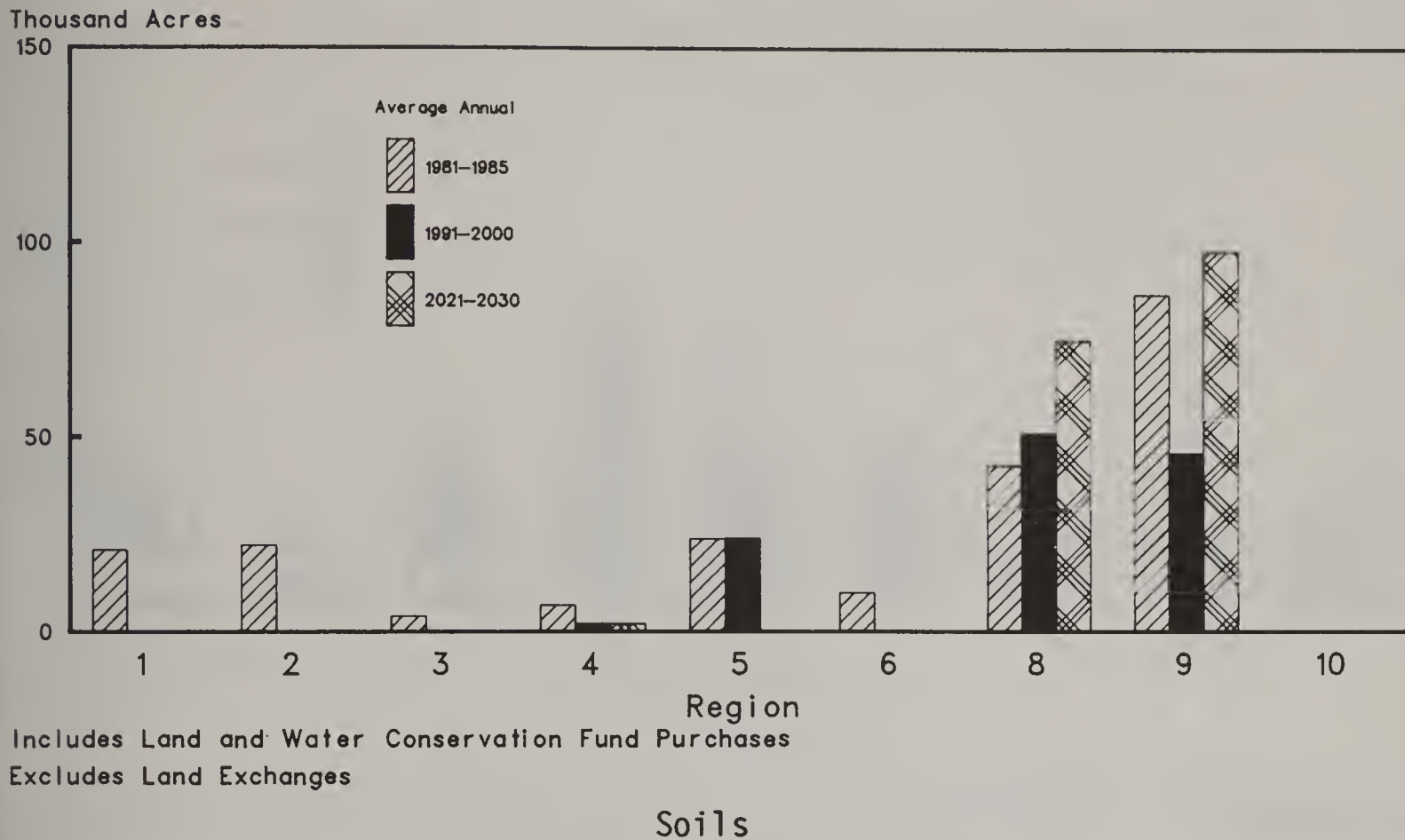
Special Land Uses, NFS.--Plan and provide for special land uses to ensure minimum impact on non-market outputs.

Outputs and Activities

National Forest System.--Land and resource management plans would be completed for all lands within the National Forest System by the mandatory October 1985 date. Planning would be at a moderate level and intensity to ensure reliability. Special studies would be accelerated to ensure a high level of nonmarket outputs on National Forest System lands. Landline location, marking, and status would be at a level to discourage potential trespass expected from an increase of resource output activities on adjacent private and public lands. Title claims activity would be increased moderately as private owners' efforts to develop use of their lands reveal title conflicts which must be resolved. Land purchases using Land and Water Conservation Funds would be at a high level until the program ends in 1989. Land purchases using regular (Weeks Act) funding would be at a moderate level to acquire critically needed lands to improve the manageability of eastern National Forests, but substantially below optimum for efficient management. Land exchange and adjustments would be at a moderate level to resolve critical problems and improve land-ownership patterns which would enhance nonmarket output on National Forest land and production of all outputs on State and private lands (figure 3.173). For example, a land acquisition and exchange program would be pursued that would place heavy emphasis on lands needed for dispersed recreational activities, wildlife and fish habitats, and for watershed protection. Special land uses are primarily externally imposed. Needs of others for special uses of National Forest System lands would increase as a result of the increase in the national economy. Efforts would be to plan for and fulfill reasonably justified requests for use. Existing uses would be managed to protect the public interest.

Regional Estimates-Alternative 4a

Land Purchase and Acquisition (NFS)



National Goals

Technical soil support services, NFS.--Provide key technical soil services needed to maintain and selectively improve soil productivity.

Soil resource improvement, NFS.--Improve soil resources to increase productivity on intensively managed timber lands and to enhance environmental and recreational values.

Soil inventories, NFS.--Emphasize soil inventories aiding intensive management of selected timber lands and those that aid environmental assessment.

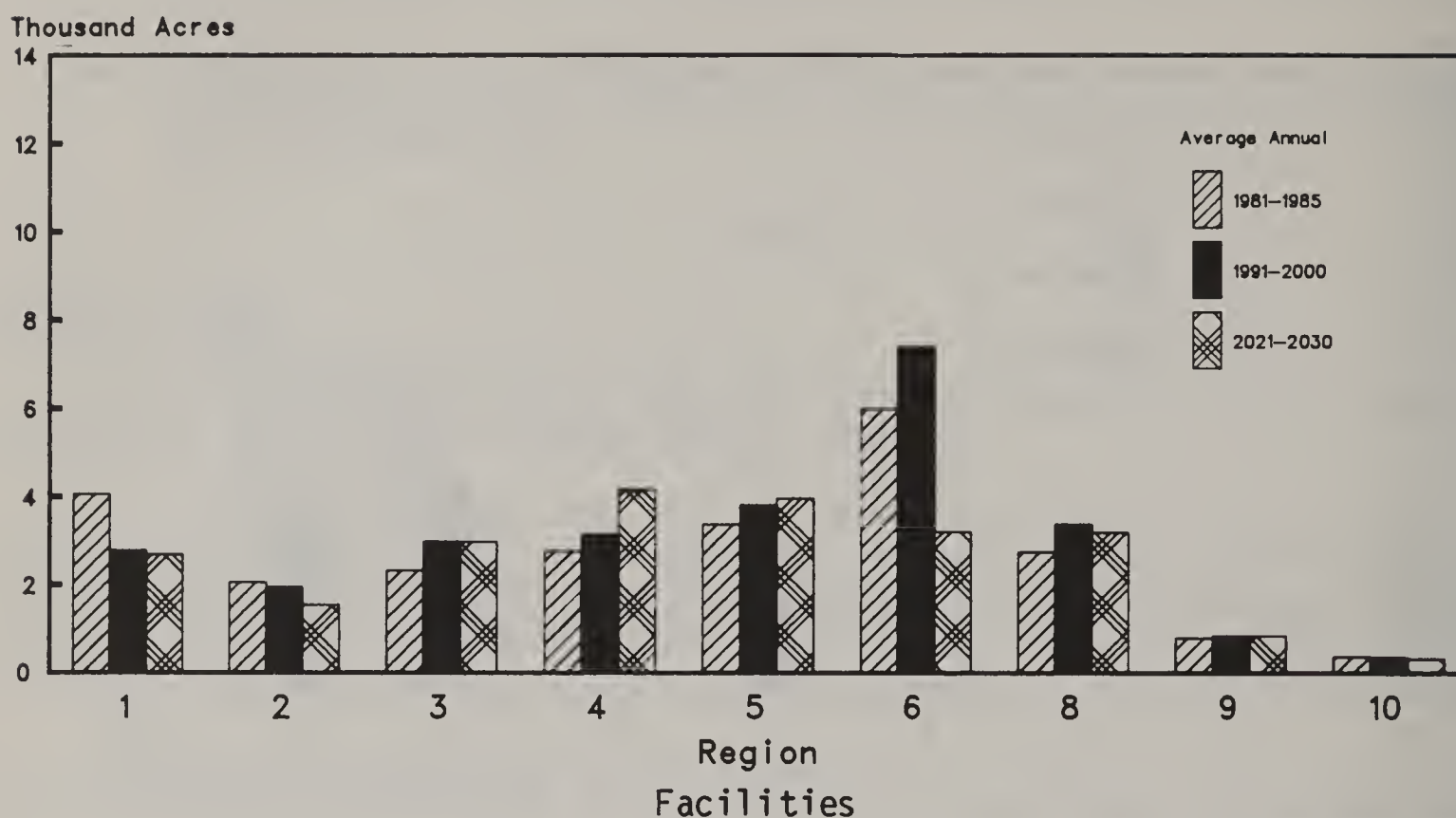
Abandoned mineland reclamation, NFS.--Provide for current level reclamation efforts. Give priority to areas where there are important public health and safety problems or significant erosion and water pollution problems.

Outputs and Activities

National Forest System.--Soil activities are in addition to the soil input to project planning of other elements which are programmed in the benefiting elements. The total inventory, monitoring, data for land management planning and improvement programs are planned and funded directly in the soil element. This Alternative stresses soil resource inventories of selected areas to aid in increasing timber productivity and environmental quality. Resource improvements would stress increasing timber productivity on selected sites and improving environmental quality (figure 3.174). Improvement maintenance would be at a moderate level.

Regional Estimates-Alternative 4a

Soil and Water Quality Improvement (NFS)



National Goals

(For National Goals for the facilities element in Alternative 4a, see Alternative Program Direction 3.)

Outputs and Activities

This Alternative proposes a high noncommodity output of National Forest System services and moderate increases in commodity outputs.

Recreational use of both developed and undeveloped lands in this Alternative presupposes high levels of public use. A large facilities program in line with Alternative 3 is needed to provide for the health, safety, and welfare of these users. Programs considered are:

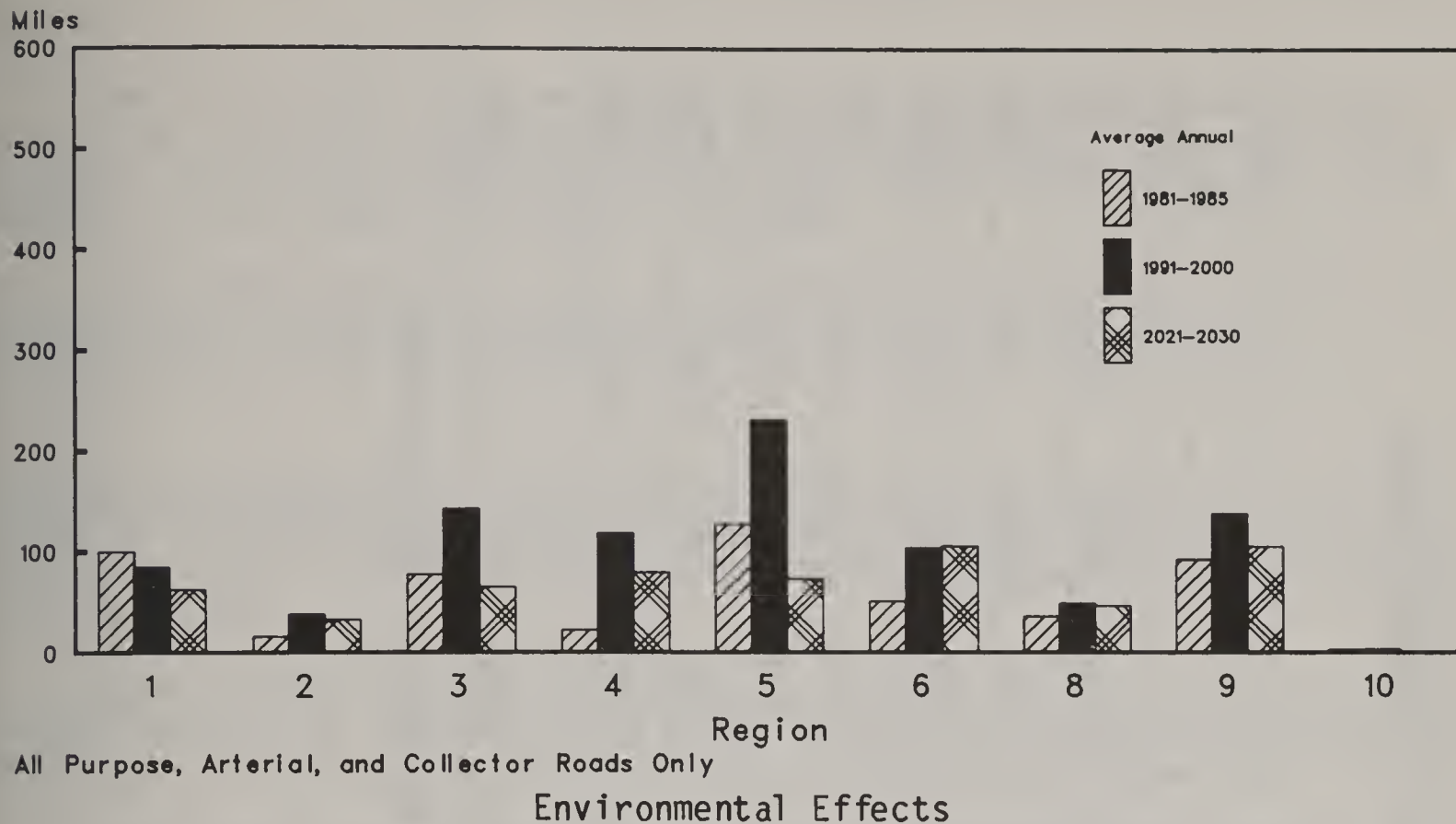
- Energy conservation.
- Safe potable water systems.
- Dam and bridge safety.
- Access for the handicapped.
- Highway safety.

These elements will require major investments in refurbishment, replacement, and new construction.

Figure 3.175 displays the work to be accomplished by Regions in order to complete principal transportation systems by 2020.

Regional Estimates-Alternative 4a

Road Construction/Reconstruction (NFS)



The environmental effects of this Alternative--physical-biological, economic, and social--are summarized on the following pages. For a more detailed description of these effects, see chapter 4.

Physical-Biological Effects

Under Alternative 4a, water quality goals would be met with no increase in yield over the present condition. Air quality would not significantly change over current conditions in the short term but have the potential for reductions in the long term as a result of increased wildfire emissions. Visual quality would be moderately impacted in the short term and retain much of its present naturalness in the long term. Threatened and endangered plant and animal habitats would be significantly improved and impacts minimized with a resultant positive effect on population trends. Cultural resources would not receive any negative impacts and opportunities for development and enhancement would be high under this Alternative.

Economic Effects

The present net worth for the total National Forest System Alternative 4a over 50 years is \$48.5 billion at 7-1/8 percent (table 3.25).

Timber and water provide the largest net benefits. Together these elements account for over 60 percent of total present net worth. Recreation, minerals, wildlife and fish, and wilderness also have large positive values. Positive values exist in all resource elements.

This Alternative yields a positive present net worth for each Region. The Pacific Coast Regions (Regions 6 and 5) contribute 54 percent of the present net worth (36 and 18 percent, respectively).

Table 3.25--NFS present net worth for Alternative 4a
discounted at 7-1/8 percent by resource element & region

(Million Dollars)

Element	NFS Regions										Total by Element
	1	2	3	4	5	6	8	9	10		
Recreation	146	1,128	479	884	2,878	821	1,632	840	210	9,018	
Wilderness	128	564	67	308	980	119	-14	244	1	2,397	
Wildlife & Fish	245	793	416	557	126	504	278	284	193	3,396	
Range	46	81	34	-51	11	-2	2	-7	-	114	
Timber	-95	-146	41	-23	3,640	14,506	569	-442	-545	17,505	
Water	4,162	1,284	118	1,806	1,144	1,536	230	67	1,361	11,708	
Minerals 1/	230	1,475	381	1,318	2	-75	120	349	608	4,408	
Total by Region	4,862	5,179	1,536	4,799	8,781	17,409	2,817	1,335	1,828	48,546	

1/ Value for locatable materials other than uranium and thorium was not determined.
This primarily impacts the values in Region 5.

Recreation, wildlife and fish, and water have positive values in all Regions. The Pacific Southwest Region (Region 5), and the South (Region 8) provide 50 percent of recreation values (32 and 18 percent, respectively). Also, Region 1 of the Rocky Mountains contributes over 36 percent of water values.

The Pacific Coast Regions (Regions 6 and 5) contribute significantly toward the national present net worth values for timber. However, Regions 1, 2, and 4 of the Rocky Mountains, the Eastern Region (Region 9), and Alaska (Region 10) have negative values for timber.

The southern portion of the Rocky Mountains (Regions 2, 3, and 4) contribute over 72 percent of mineral values (33, 9, and 30 percent, respectively).

Returns to Government.—Returns to government expected from gross sale (or lease) of National Forest System resources for Alternative 4a are \$1,680 million in 1981, \$2,179 million in 1985, \$2,956 million in 1995, and \$5,969 million in 2025.

These returns include cash payments, required deposits from purchasers to finance activities resulting from timber sales (such as Knutson-Vandenberg deposits), and credits allowed for work performed by the purchasers.

The Alternative 4a annual revenues (returns to the government, in either dollars or credits), are as follows:

(Million Dollars)				
Activity	1981	1985	1995	2025
Recreation	12	15	18	22
Grazing	23	17	19	20
Timber	1,480	1,856	2,433	4,880
Minerals, NFF <u>1/</u>	<u>22</u>	<u>37</u>	<u>49</u>	<u>89</u>
Total NFF <u>2/</u>	1,537	1,926	2,520	5,011
Minerals, BLM <u>3/</u>	<u>143</u>	<u>254</u>	<u>437</u>	<u>958</u>
Total Government	1,680	2,179	2,956	5,969

1/ (NFF) National Forest Fund.

2/ Historically, approximately 25 percent of the National Forest receipts have been paid to States for redistribution to local county governments. Payments are also made by BLM. These payments are in lieu of taxes.

3/ Mineral royalties collected from public domain National Forest System lands and reported by Bureau of Land Management.

Social Effects

The effects of Alternative 4a would be similar to Alternative 4. Non-metropolitan areas dependent upon Forest Service programs would face major changes.

Community economies, community identity and opportunities for leisure and housing are variables most affected. On a national basis, this Alternative would provide for a slightly increased contribution to energy, mineral supplies and housing materials.

Alternative 4a represents an increase in outputs from nonfederally owned forests and range lands. Generally, the major benefits from these outputs would be felt upon communities near privately owned forests.

Similar to Alternative 4, the most "futures foregone" would result from selection of this Alternative. "Conflict polarization" would be similar to that expected from Alternative 2, and only exceeded by Alternative 1. (See chapter 4 for definitions.)

Sections A and B within chapter 3 have presented comprehensive descriptions of the five original Alternative Program Directions, and other alternatives considered. Chapter 4 describes the pragmatic comparison of the 1980 Recommended Program with the Alternative Program Directions.

CHAPTER 4:

Comparison of the Recommended Program to Alternative Program Directions



CHAPTER 4: Comparison of the Recommended Program
to Alternative Program Directions

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CHAPTER 4: COMPARISON OF THE RECOMMENDED PROGRAM TO ALTERNATIVE PROGRAM DIRECTIONS

This chapter compares the Recommended Program with the Alternatives described in chapter 3. Comparison is mainly through display of selected program components--outputs, activities, costs, and work force. The purpose is to facilitate understanding of the relationship of the Recommended Program to the Alternatives. The reader should refer to chapter 3 for more detailed information concerning each Alternative.

In addition to comparing selected program components, this chapter evaluates and compares the environmental effects--physical-biological, economic, and social--of the Recommended Program with the Alternatives.

The Recommended Program consists of components of each of the five Alternative Program Directions. Simple indicators of the relationship between the Program and the Alternatives are the general levels of market and nonmarket outputs resulting from National Forest System and State and Private Forestry activities (table 4.1).

Forest Service activities are in four major areas: (1) National Forest System; (2) State and Private Forestry; (3) Research; and (4) Human Resource Development. Under the Program, the role for the National Forest System is displayed by Region for each resource element in terms of the Alternative Program Direction that it most closely resembles over the planning period at both its High and Low Bound. The composite roles for State and Private Forestry and for Human Resource Programs are most similar to Alternative 3. For Research, the role is also a composite of several alternatives, but in summary, most resembles Alternative 3.

Outputs, Activities, Costs, and Work Force

This section compares key outputs, activities, costs, and work force for the Program with those for the five Alternative Program Directions. It shows how the Program and the Alternatives fit historical trends and how the Program addresses projected demands described in the Assessment. In the accompanying figures, the Alternatives and the Program range are displayed for the planning period. The Program range is shown as a shaded area on each figure. The Program outputs, activities, and related costs in several cases will not directly correlate with the Alternative Program Directions indicated for role comparison. This is primarily due to Program changes made through final decision process evaluations that affected and revised scheduling of some Program investments.

The section is divided into two parts. The first identifies similarities and differences between the Program and the Alternatives. This information is presented by program element (recreation, wilderness, wildlife and fish, etc.) and by major program area (National Forest System, State and Private Forestry, and Research). The following narratives, figures, and tables are presented to characterize the Program and the Alternatives.

The second part of this Section compares program costs and personnel requirements of the Program to the Alternatives.

Table 4.1--Levels of outputs for Alternatives as compared to the 1975 Recommended Program ^{1/}

Alternative program directions	National Forest System outputs		State and Private Forestry outputs		Research	Human and Community Development
	Market	Nonmarket	Market	Nonmarket		
Low Bound	Moderate	Lower	Higher	Lower	Moderate	Lower
High Bound	Higher	Moderate	Higher	Higher	Higher	Moderate
1	Higher	Higher	Higher	Higher	Higher	Lower
2	Lower	Lower	Lower	Lower	Lower	Moderate
3	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
4	Lower	Higher	Higher	Higher	Higher	Higher
5	Moderate	Lower	Lower	Lower	Moderate	Moderate
4a	Moderate	Higher	Higher	Higher	Higher	Higher

^{1/} See chapter 1, part II for a description of important changes that have occurred since 1975 that cause adjustments in the 1975 Program outputs.

^{2/} Absolute or actual levels for NFS and S&PF outputs differ greatly. See chapter 3 for actual output levels. Higher and lower descriptions are relative differences from the moderate level.

Recreation

National Forest System.--All Alternatives except No. 2 would provide substantial short-term increases in both developed and dispersed recreation. The Program provides for substantial long-term increases in recreation use (figures 4.1, 4.2, and 4.3). ^{1/} In the short term (through 1985), however, the Program is more similar to Alternative 5 at the High Bound, and 10 percent below Alternative 2 at the Low.

At the High Bound, the Forest Service would continue to supply its current share of outdoor recreation use. By contrast, Alternative 2 would de-emphasize Forest Service programs providing services to National Forest visitors and lead to a long-run decline in both use and quality of experience. Alternative 1 required high initial investments, but would have created even more opportunities and use than the Program.

Alternative Program Directions
for the Recommended Program by Region
(1986 and Beyond)

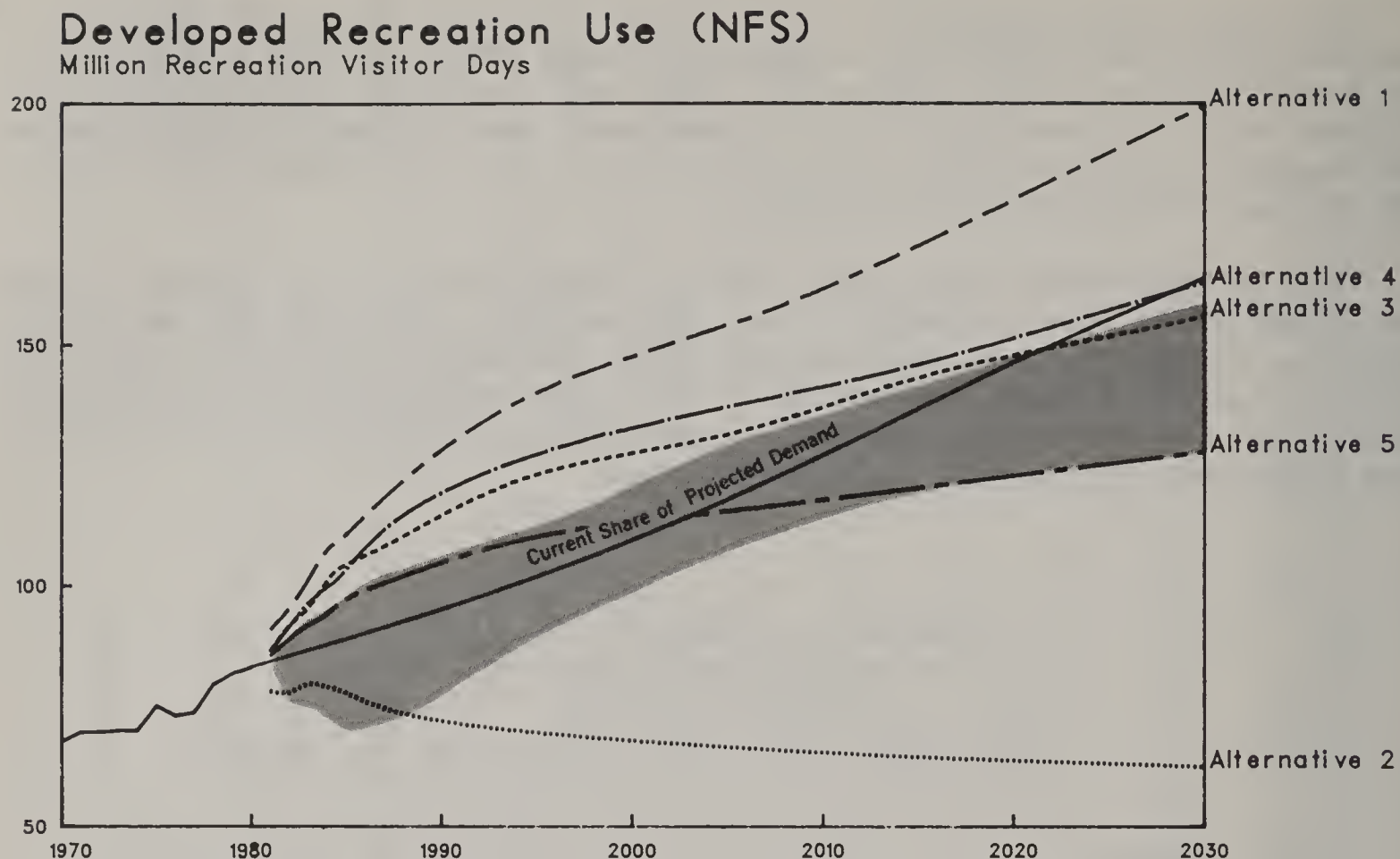
Region	1	2	3	4	5	6	8	9	10
Recommended Program: High	5	4	5	5	3	5	4	4	4
Low	5	3	5	5	5	5	5	5	5

State and Private Forestry.--All Alternatives except No. 2 would increase the level of technical assistance provided to non-Federal forest landowners. Both the High and Low Bounds of the Program provide an increasing level of technical assistance for nonincome-producing dispersed recreation, particularly in the Northeast (figure 4.4). ^{1/} The Low Bound would increase such assistance much less rapidly than the High Bound. Private owners desiring technical assistance for income-producing projects would be referred to the Soil Conservation Service or to consultants.

Research.--At the High Bound of the Program, recreation research would increase to Alternative 4 in 1995 (figure 4.5). ^{1/} At the Low Bound, it would increase to slightly above Alternative 5 in 1995. The increased recreation research is in response to projected increases in demand for both developed and dispersed backcountry recreation, and the need for better management guidelines as demand increases.

^{1/} Historical data and the current share of projected demands are shown as solid lines, Alternatives are shown as broken lines, and the Program range is shown as a shaded area.

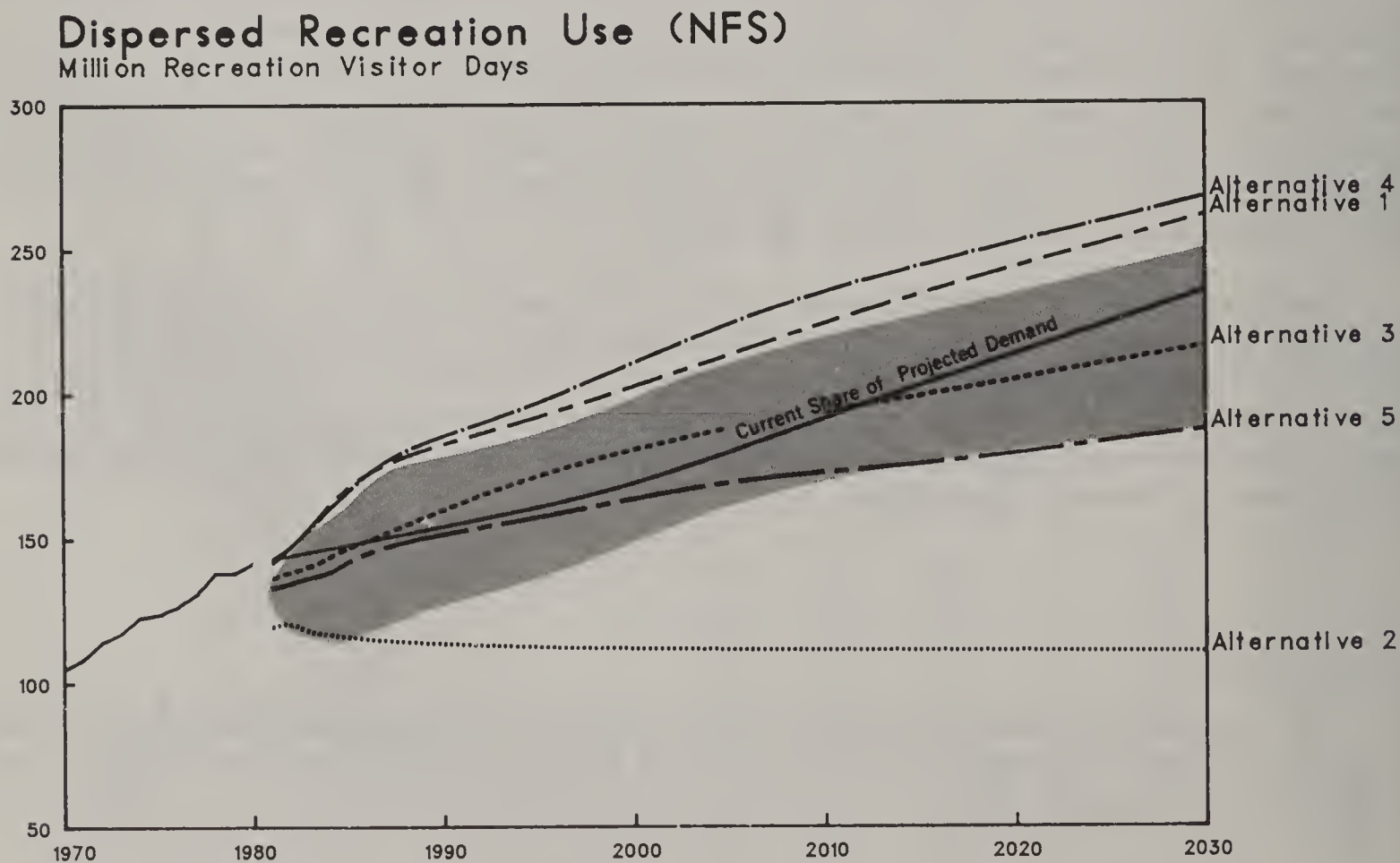
Figure 4.1



Includes Visitor Information Services

The current share of projected demand displays the outputs over time that would be produced by Forest Service programs if they continue to contribute their current proportionate share of national demand.

Figure 4.2



Excludes Wilderness Use

Figure 4.3

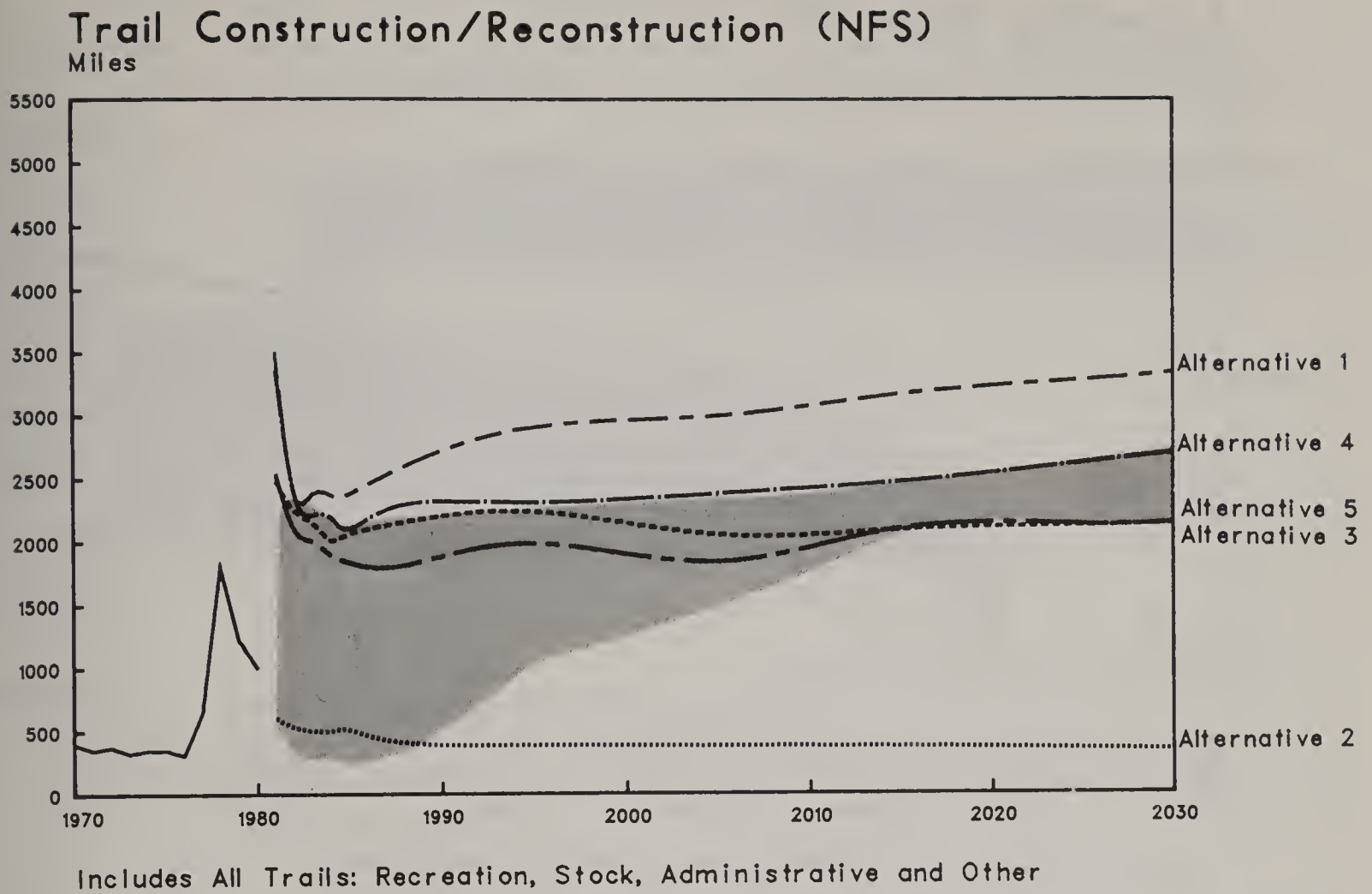


Figure 4.4

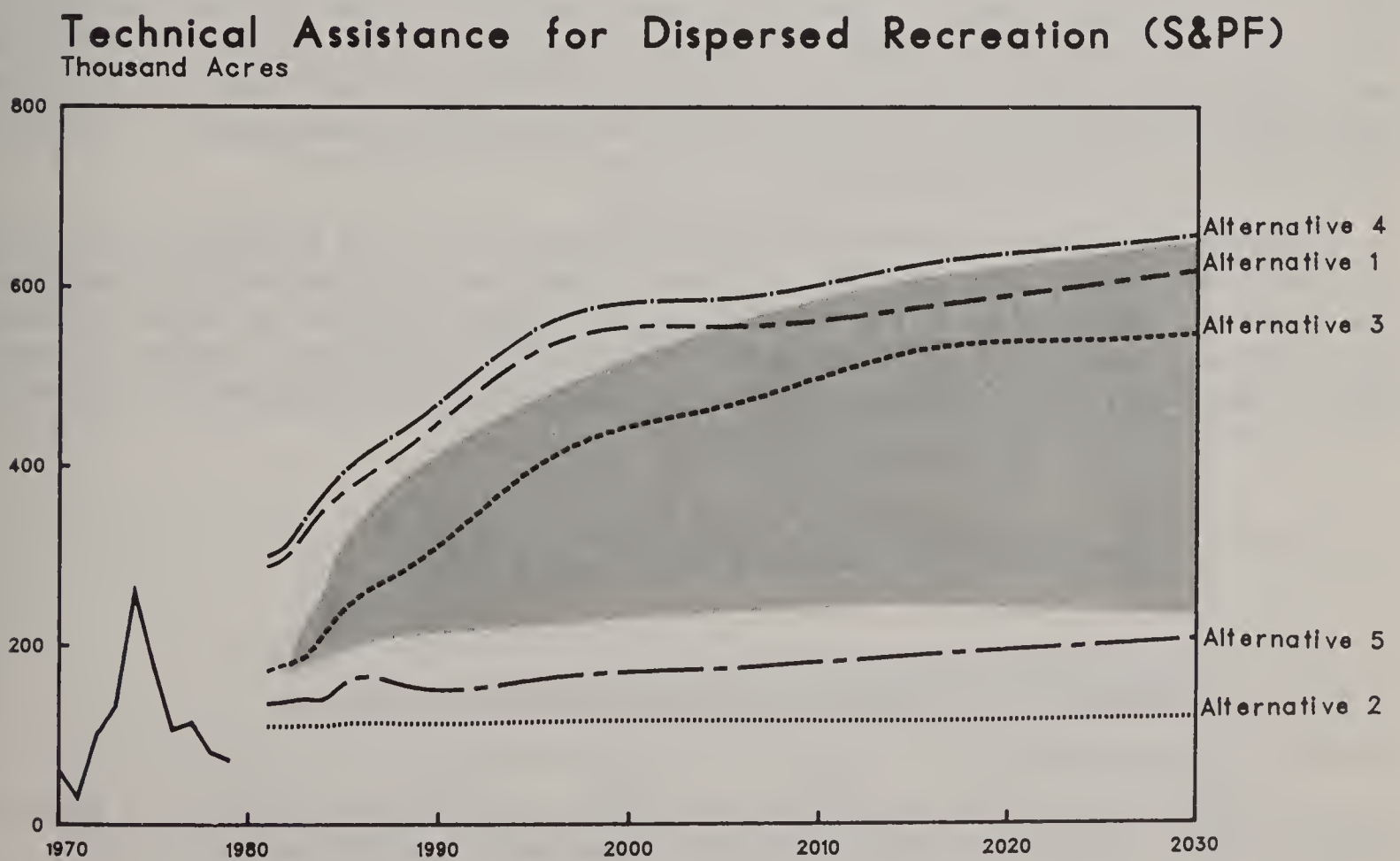
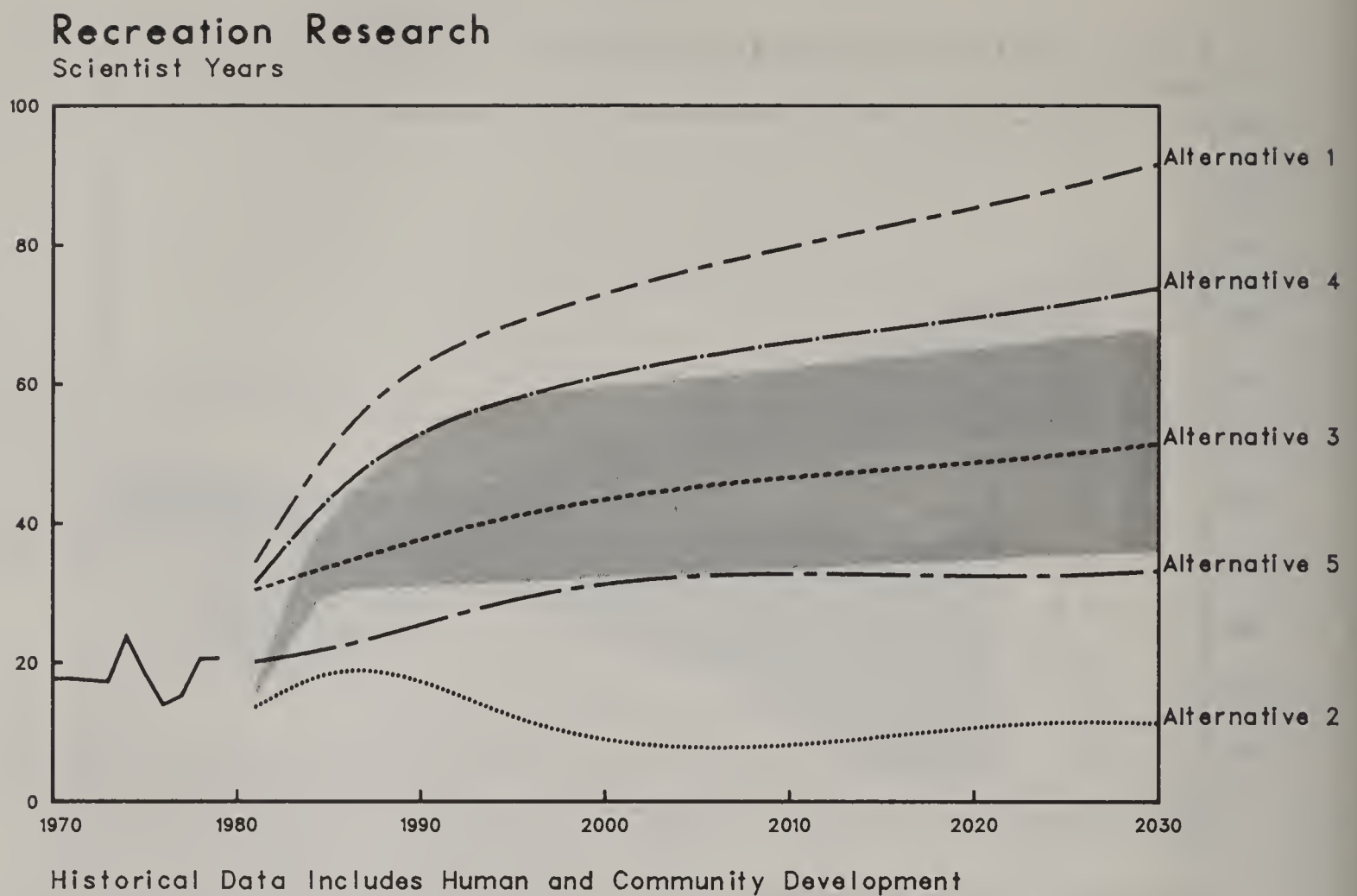


Figure 4.5



Wilderness

National Forest System.--The Program provides for substantial increases in acreage of designated Wilderness. This recommendation emerged from the RARE II process. The final acreage in designated Wilderness could be as much as 42 million acres at the High Bound and 34 million at the Low (figure 4.6). ^{2/} The choice of specific areas is subject to decisions on acres now designated for further planning. At the High Bound, the Program would provide more acres than Alternative 3 as well as high-quality management. The Low Bound would provide for more modest increases in Wilderness.

Figure 4.6 also illustrates the relationship of the Program to the other Alternatives. Alternative 4 would provide much more Wilderness acreage than the Program, but would be incompatible with higher outputs of other resources. Alternative 2 would not be consistent with policy decisions reached in the RARE II process. The acre estimates for each Region correspond to Alternative as follows:

^{2/} Historical data are shown as a solid line, Alternatives are shown as broken lines, and the Program range is shown as a shaded area.

Figure 4.6

Wilderness Management (NFS)

Thousand Acres

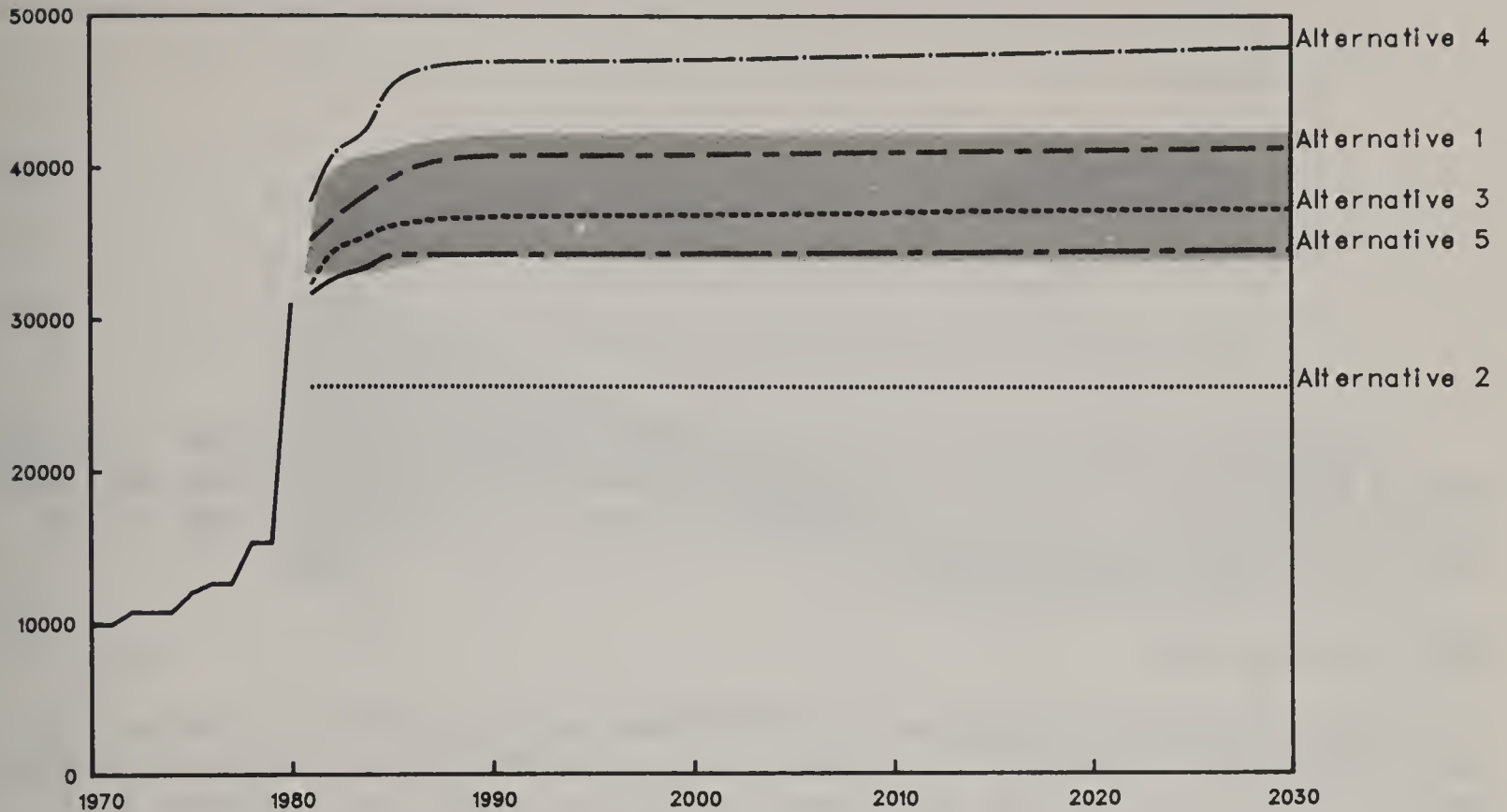
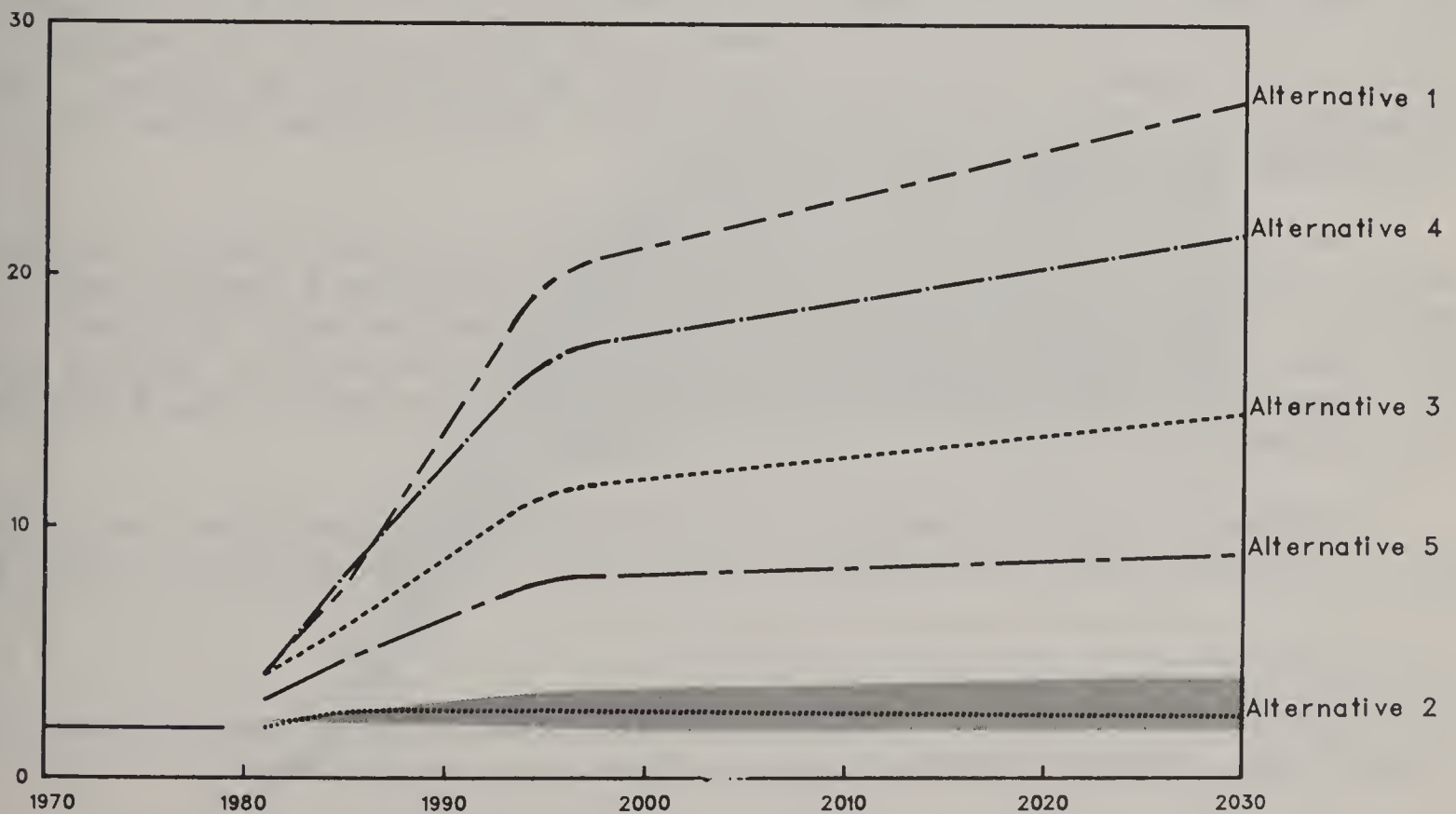


Figure 4.7

Wilderness Research

Scientist Years



Research on Recreation in Wilderness Areas is Included in the Recreation Element

Alternative Program Directions
for the Recommended Program by Region
(1986 and Beyond)

Region	1	2	3	4	5	6	8	9	10
Recommended Program: High	1	4	5	1	4	3	4	1	1
Low	2	5	2	3	5	5	5	3	3

Research.--Wilderness research at both Bounds of the Program is approximately Alternative 2 (figure 4.7). ^{3/} Research related to dispersed back-country recreation supports Wilderness management but is included in the recreation element.

Wildlife and Fish

National Forest System.--The High Bound would provide an increasing level of wildlife habitat improvement through 1985, then a decline to 2030. The Low Bound follows the same trend, but at a lower level (figure 4.8). ^{3/} After 1995 all habitat improvement would be replacement projects. At both Bounds, habitat improvement maintenance increases to 1995, then levels off through 2025, as do wildlife populations and the hunting and other wildlife use dependent on improved habitat. In addition, the contribution to commercial salmon fishery increases sharply (figure 4.9). ^{3/} Special emphasis is given to protection and restoration of endangered and threatened species habitat and to development of anadromous fish habitat. Habitats for other fish species will also be improved. Collectively, the improvements at the High Bound would accomplish about 65 percent of the cooperative plans for 1981 developed jointly with the State fish and wildlife agencies pursuant to the Sikes Act (P.L. 93-452). Overall, the High Bound of the Program approximates Alternative 3, but Alternatives selected vary by Region. The following table shows the expected changes in carrying capacity for the Program and the Alternatives:

The Low Bound would cause a slight decrease in wildlife and fish populations overall. Populations of endangered and threatened species would generally remain stable; those of several plant species would decline. Anadromous fish populations would increase slightly because of program emphasis. Initially, the Low Bound would accomplish 47 percent of the Sikes Act planning and would drop to 25 percent by 1985.

Alternative 2 would continue to decrease habitat improvement activity until a minimum level was reached at about 1990. Alternatives 1, 3, and 4

^{3/} Historical data are shown as a solid line, Alternatives are shown as broken lines, and the Program range is shown as a shaded area.

Figure 4.8

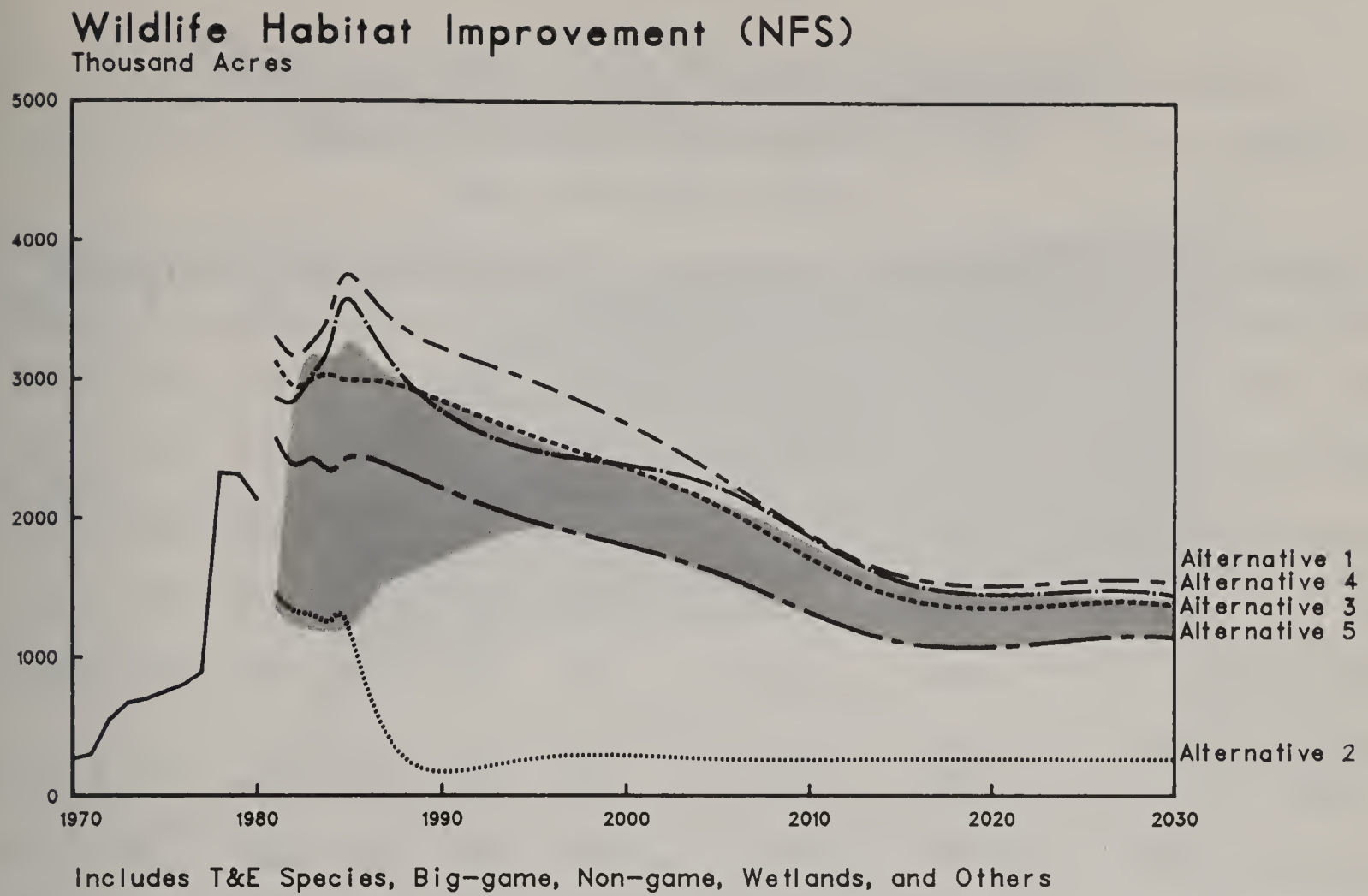


Figure 4.9

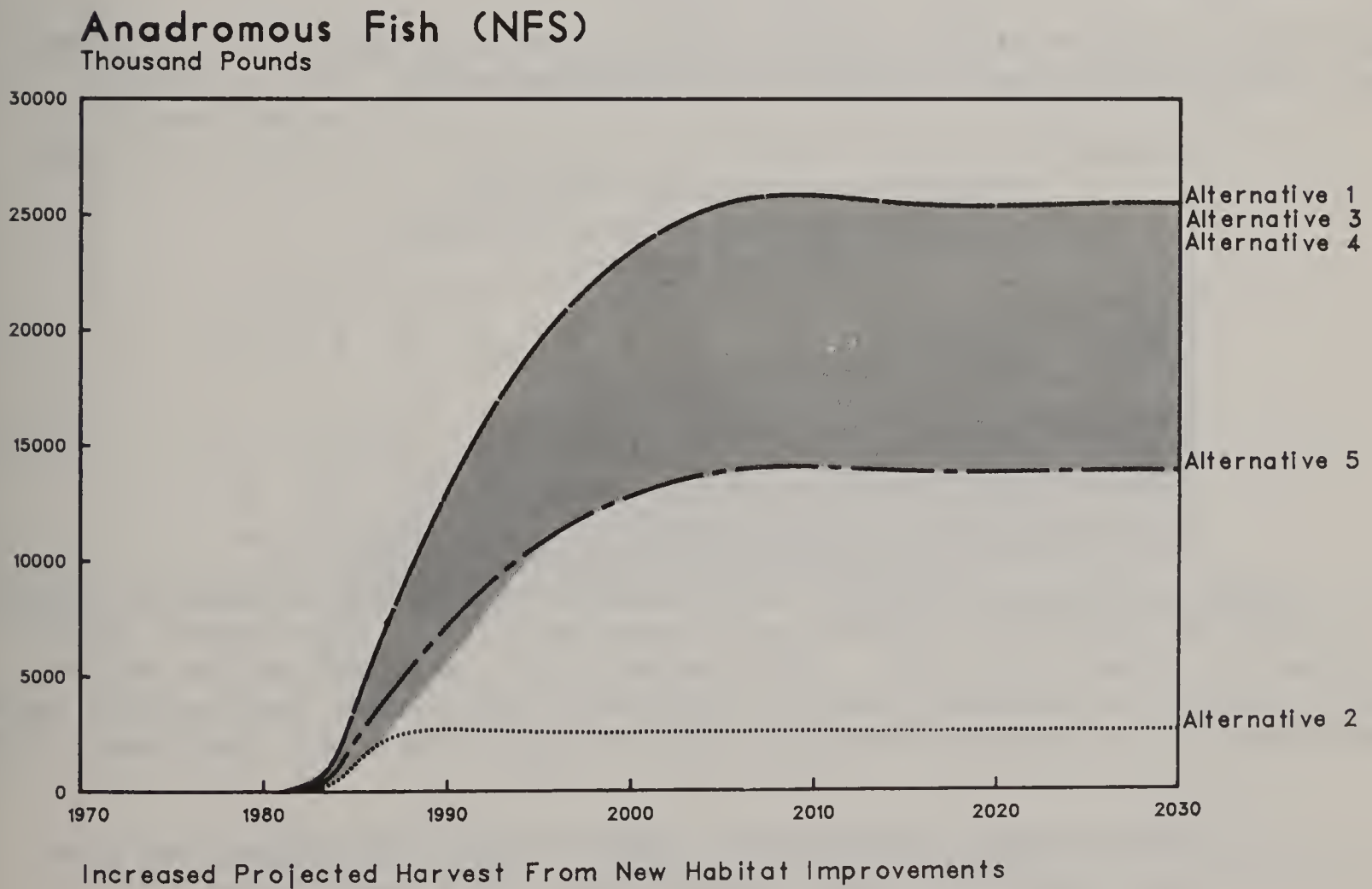


Table 4.2

Habitat Capability Index* on NFS lands for selected
Management Indicator Species or species groups
for the Program and Alternatives in 1995

(Current Situation = 100)

Species/ Species Group	Recommended Low	Program High	Alternative Program Direction					
			1	2	3	4	5	4a
Mule deer	95	120	133	80	120	125	110	125
White-tailed deer	95	120	135	90	120	125	110	125
Black-tailed deer	95	125	155	90	125	130	110	130
Elk	90	118	130	80	118	120	105	120
Wild Turkey	95	133	170	90	133	160	100	160
Cavity-nesting birds	95	100	80	90	100	100	100	100
Resident trout	95	120	125	90	115	135	100	135
Anadromous fish	105	130	125	80	130	135	90	135

* Average carrying capacity in relation to every 100 animals under current conditions.

would peak at their highest level in 1985 in order to maximize their effect on wildlife populations throughout the planning period.

Alternative Program Directions
for the Recommended Program by Region
(1986 and Beyond)

Region	1	2	3	4	5	6	8	9	10
Recommended Program: High	5	1	4	4	3	3	3	3	3
Low	5	5	5	5	5	5	3	5	5

State and Private Forestry.--All Alternatives except Alternative 2 would increase the levels of technical assistance provided to non-Federal forest landowners (figure 4.10). ^{4/} Both the High and Low Bounds of the Program would provide an increasing level of technical assistance, particularly in the Northeast. The Low Bound increases would be much less rapid than those at the

^{4/} Historical data are shown as a solid line, Alternatives are shown as broken lines, and the Program range is shown as a shaded area.

Figure 4.10

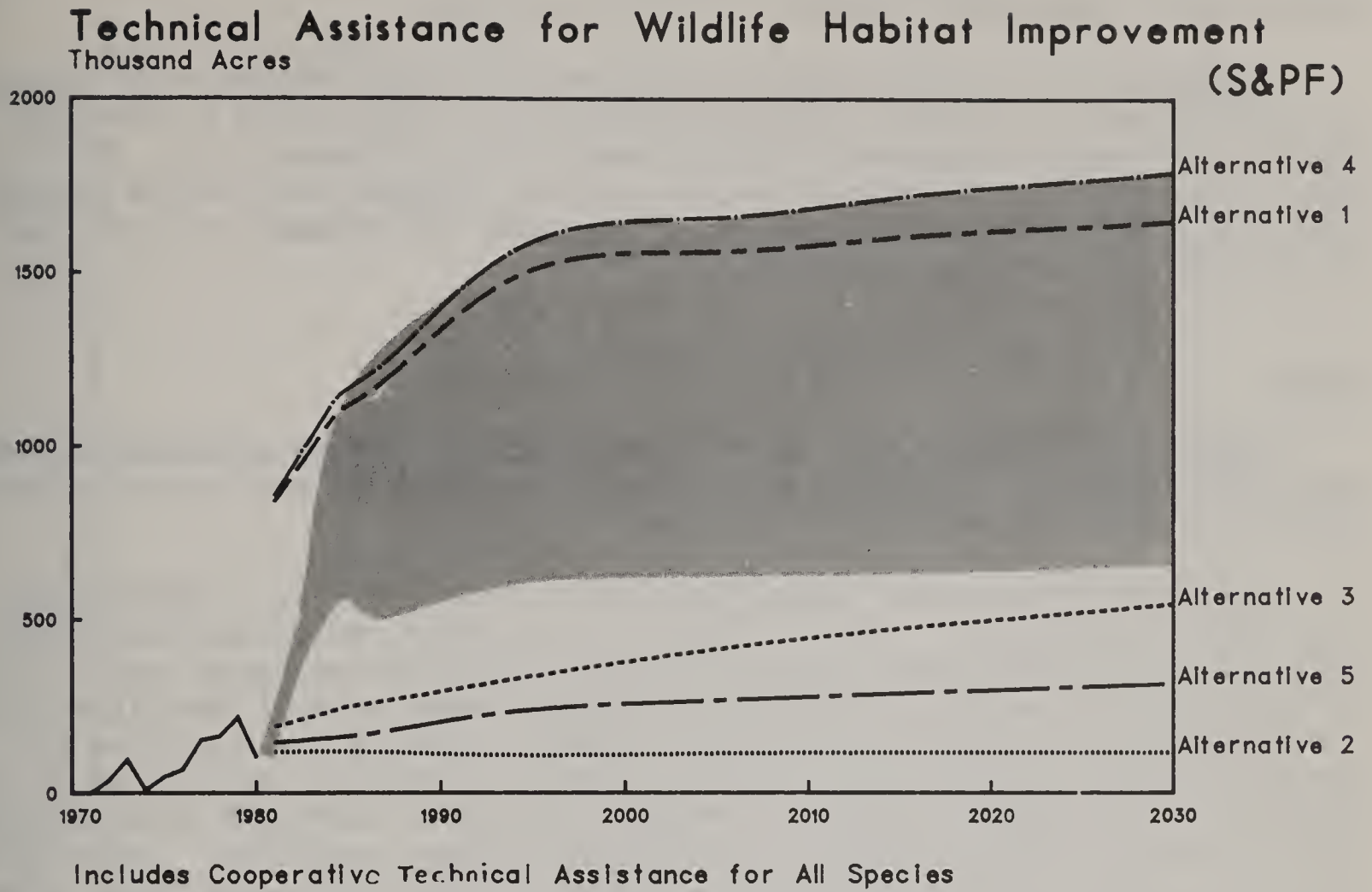
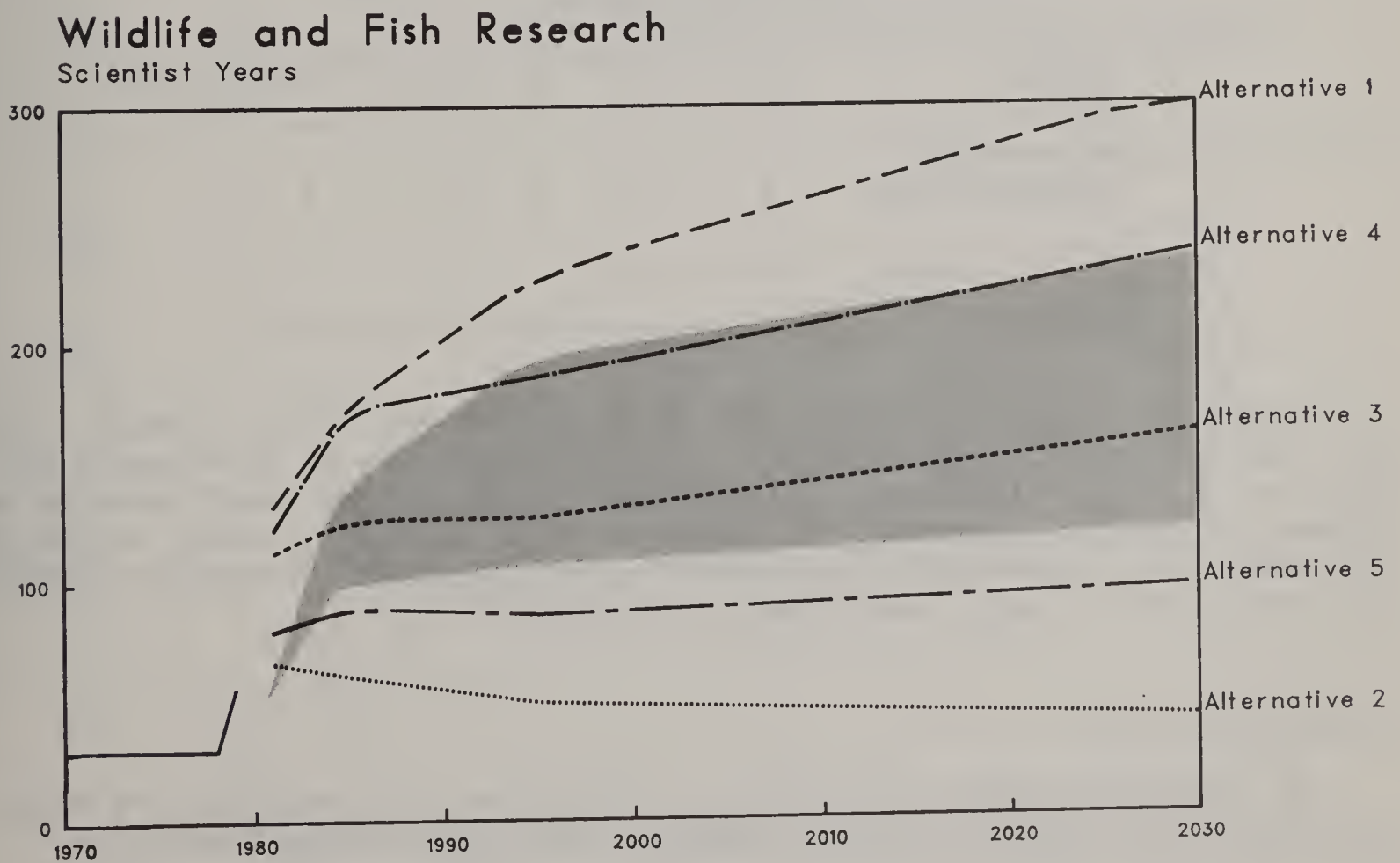


Figure 4.11



High Bound. An important part of this assistance is for the identification and protection of endangered and threatened plant and animal species in cooperation with appropriate Federal and State agencies.

Research.--At the High Bound of the Program, wildlife and fish research would increase to slightly above Alternative 4 by 1995, while at the Low Bound it increases to between Alternatives 3 and 5 (figure 4.11). Wildlife and fish research would support growing action programs and provide management guidelines needed for anadromous fish, game and nongame wildlife, and endangered and threatened species.

Range

National Forest System.--In the long run, the Program continues current permitted use (figure 4.12) ^{5/} with some intensification and concentration of grazing on the most cost-effective areas.

The Program maintains range grazing at current levels. Alternatives 1 and 3 would increase it. Alternatives 2 and 4 would reduce National Forest grazing. Much of that part of the National Forest System range that is still in poor condition would be handled differently under each of the Alternatives. Alternatives 1, 3, and, to some extent, 5 would improve the condition of rangeland either through revegetation projects or through specialized grazing regimes. Little could be done to improve rangeland conditions under Alternative 2 except to remove livestock from range in poor condition. Under Alternative 4, improvements would be initiated where they would complement other resource uses such as wildlife and recreation. The High Bound differs from the Low Bound in that improvement of range conditions would be accelerated.

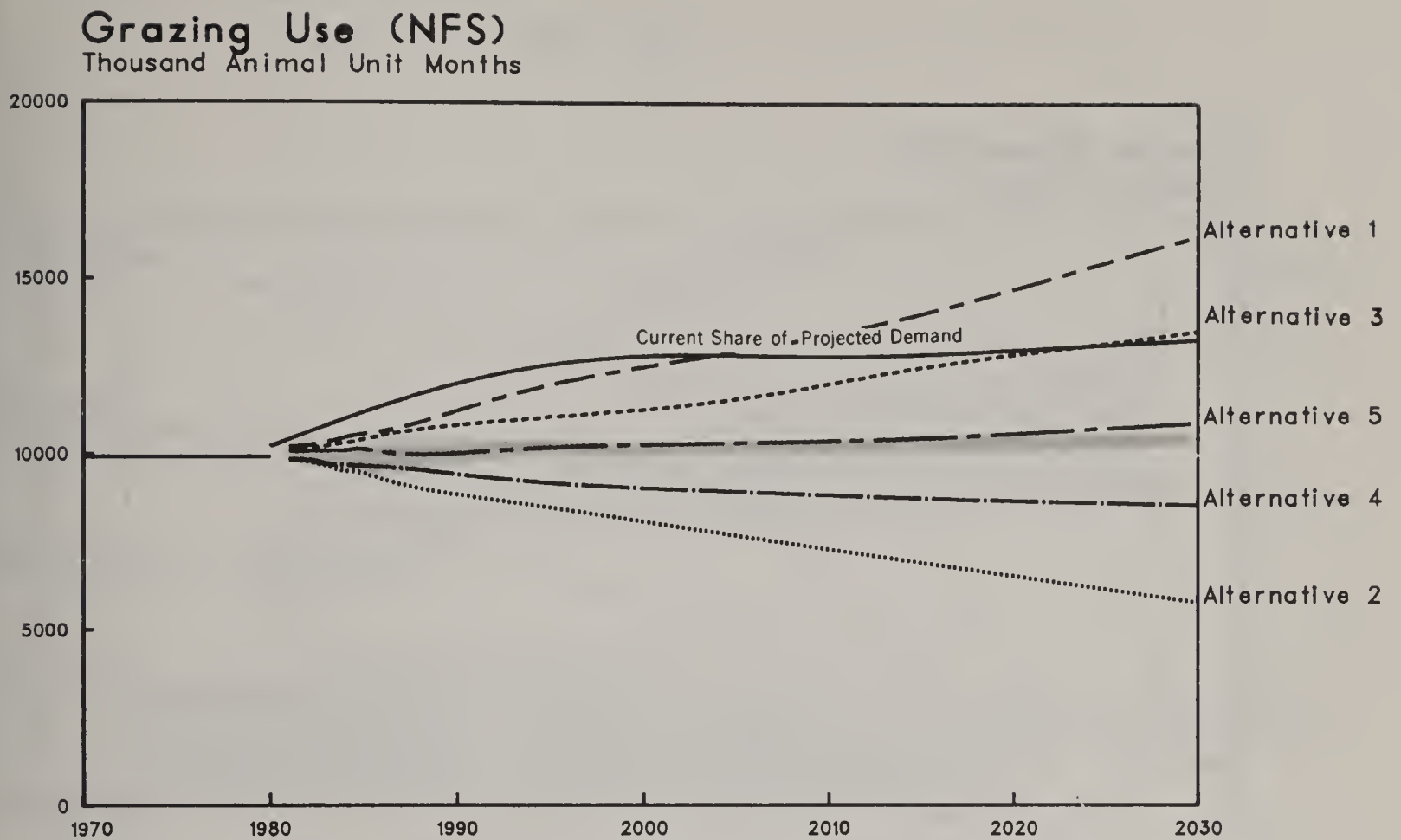
Alternative Program Directions
for the Recommended Program by Region
(1986 and Beyond)

Region	1	2	3	4	5	6	8	9
Recommended Program: High	5	5	3	5	5	5	5	5
Low	5	5	3	5	5	5	5	5

State and Private Forestry.--All Alternatives except No. 2 would increase the level of technical assistance for forage production on non-Federal forested ranges. Both the High and Low Bounds of the Program would provide an increasing level of technical assistance (figure 4.13), ^{5/} except in the Northeast where range improvement opportunities are limited. Particular emphasis would be given to range improvement in the South.

^{5/} Historical data are shown as a solid line, Alternatives are shown as broken lines, and the Program range is shown as a shaded area.

Figure 4.12



The current share of projected demand displays the outputs over time that would be produced by Forest Service programs if they continue to contribute their current proportionate share of national demand.

Figure 4.13

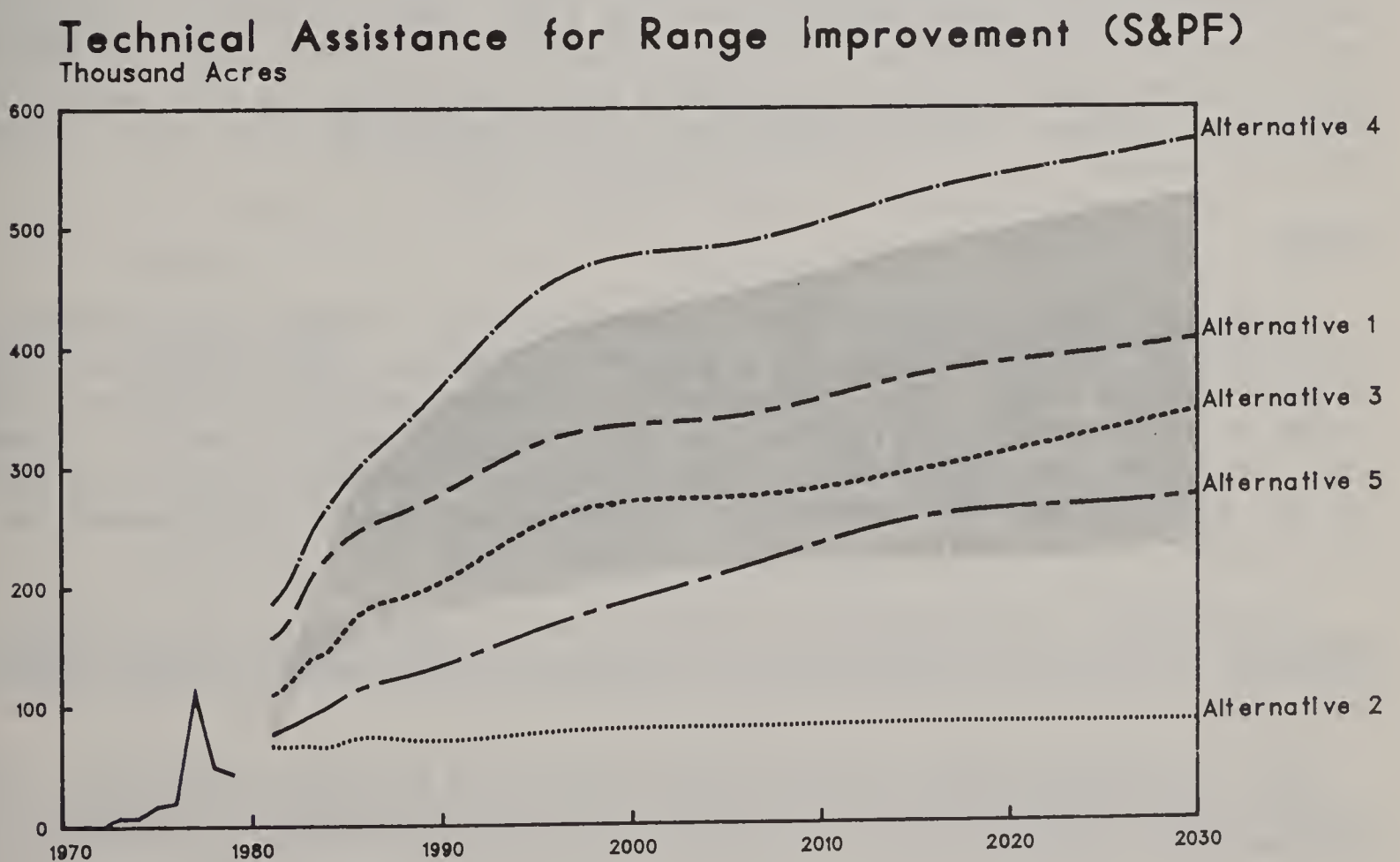
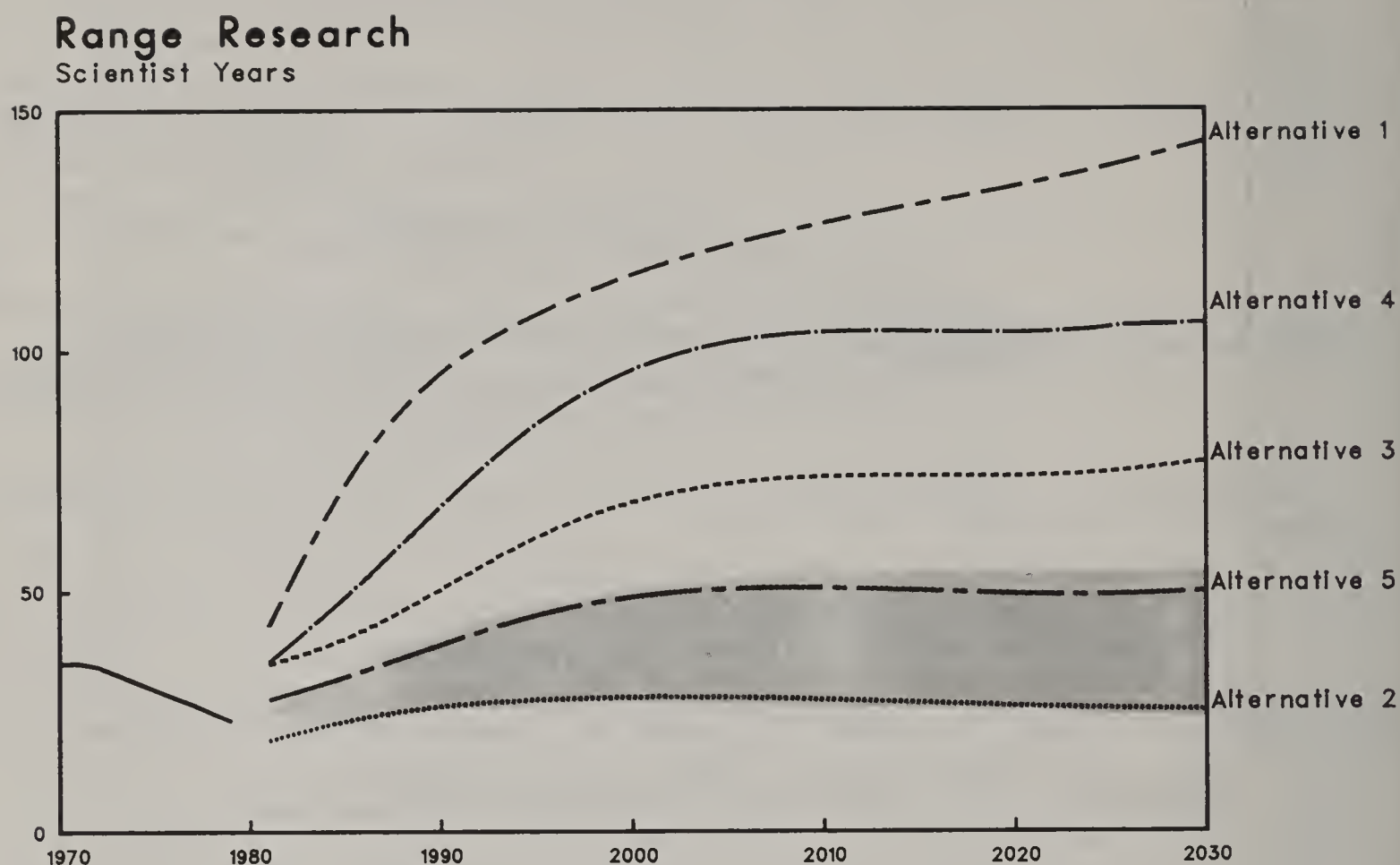


Figure 4.14



Research.--At the High Bound of the Program, range research would increase to slightly above Alternative 5 by 1995, while at the Low Bound it would remain at Alternative 2 (figure 4.14). ^{6/} Increased range research will provide guidelines for range management and restoration, on both public and private ownerships, and for management and protection of arid lands to prevent desertification.

Timber

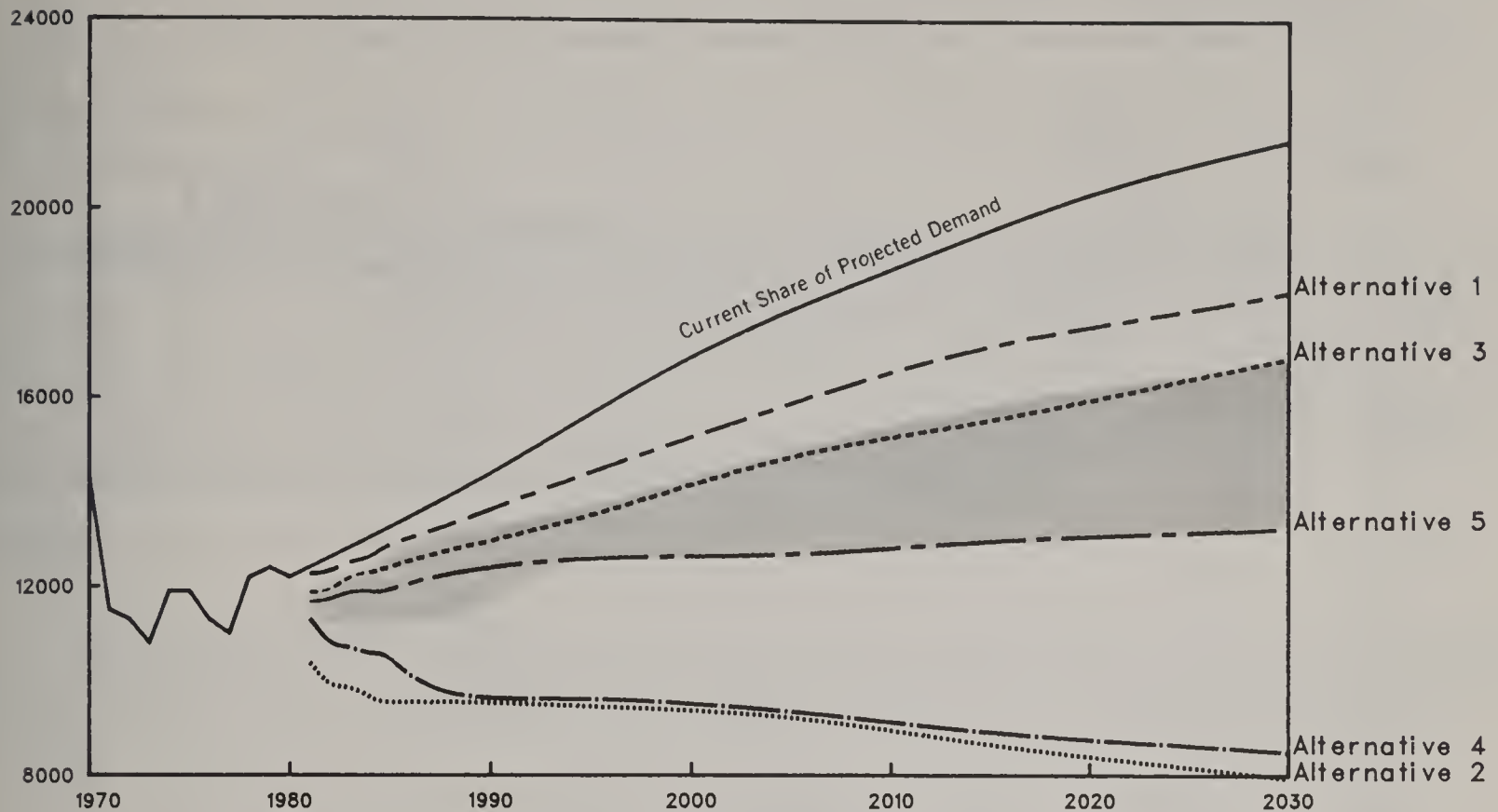
National Forest System.--The Program increases timber sale offerings about 34 percent at the High Bound and 8 percent at the Low over current offerings by 2025 (figure 4.15). ^{6/} Increases in timber production are concentrated in the more productive regions of the Pacific Coast and the South. Stumpage price increases are dampened under the Program. National Forest sale offerings for all Alternatives fall below the current share of projected demand for timber supplies under equilibrium price assumptions.

In contrast to the Program, Alternatives 2 and 4 would limit timber sales offerings and capital investments to currently accessible or highly productive

^{6/} Historical data and the current share of projected demand are shown as solid lines, Alternatives are shown as broken lines, and the Program range is shown as a shaded area.

Programmed Sales Offered (NFS)

Million Board Feet (Local Scale)



Includes Live and Mortality; Hardwood and Softwood

The current share of projected demand displays the outputs over time that would be produced by Forest Service programs if they continue to contribute their current proportionate share of national demand.

jobs within and adjacent to National Forests. Alternative 1 would increase timber sale offerings and make heavy capital investments, benefiting local economies within and adjacent to National Forests. Alternative 5 would maintain current levels of timber offerings. Harvested volumes would increase slightly because of better utilization and higher capital investments. Under the Program, reforestation and timber stand improvement activities are at a high level (figures 4.16 and 4.17). 7/

Alternative Program Directions for the Recommended Program by Region (1986 and Beyond)

Region	1	2	3	4	5	6	8	9	10
Recommended Program: High	3*	4	5	5	3*	3*	1	3*	1*
Low	5	4	5	5	5	5	5	5	1

* Modified

State and Private Forestry.--All Alternatives except No. 2 would increase cost-sharing and technical assistance provided to non-Federal forest landowners

7/ Historical data and the current share of projected demand are shown as solid lines, Alternatives are shown as broken lines, and the Program range is shown as a shaded area.

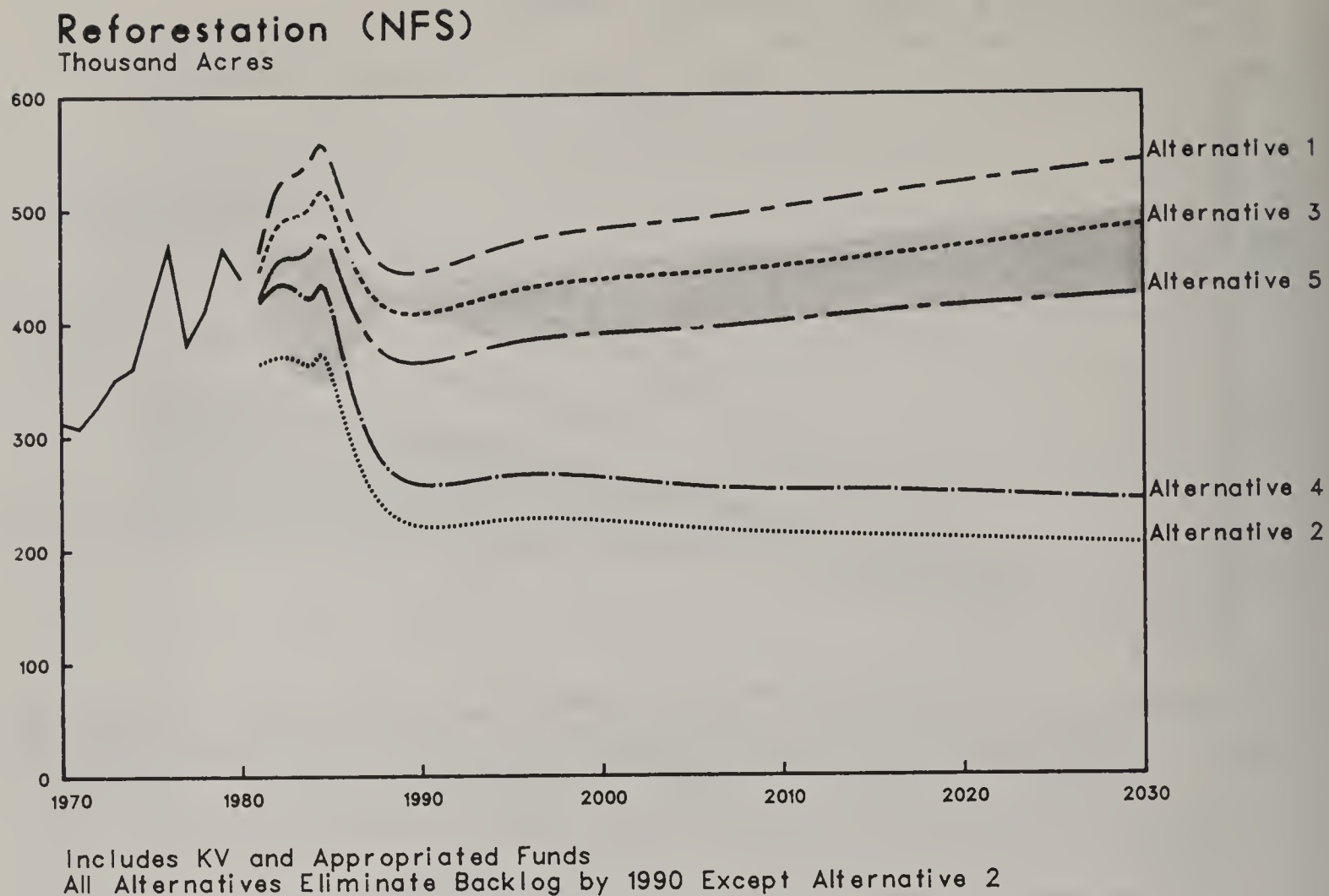
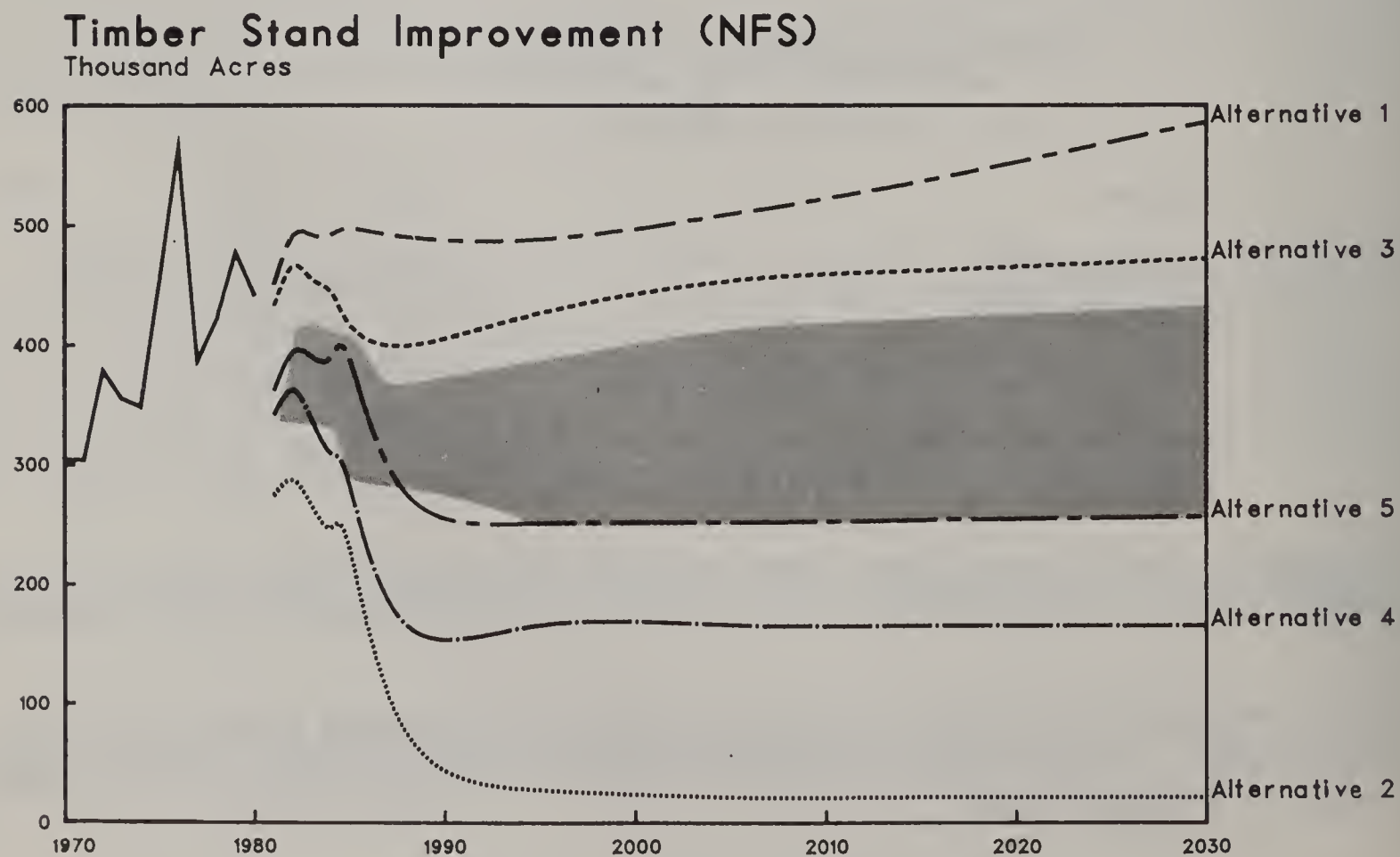


Figure 4.17



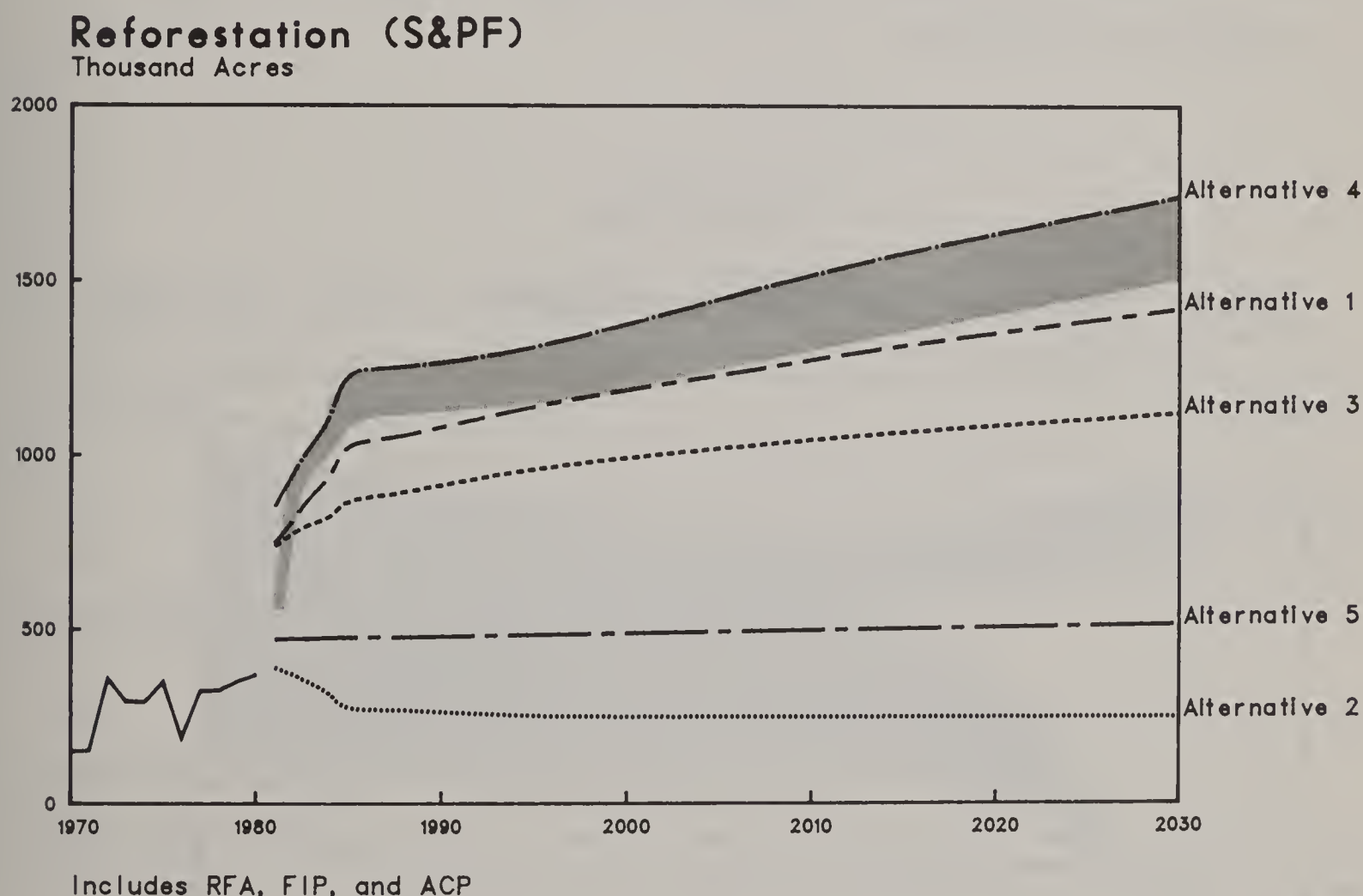
for timber management and technical assistance provided to loggers and processors for improved utilization of wood. Both the High and Low Bounds of the Program would provide for increased levels of woodland owner assistance, including timber prepared for harvest, reforestation, and timber stand improvement and for improved utilization of wood (figures 4.18 through 4.22). ^{8/} Special emphasis is given to the South for softwood regeneration and in response to other needs and opportunities identified in the Assessment.

Research.--At the High Bound, the Program for timber research would rise to Alternative 1 by 1995 while at the Low Bound it would rise to Alternative 5 (figure 4.23). ^{8/} Additional research would increase the Nation's timber supply through substitution of hardwoods for softwoods and through intensive utilization of smaller trees. It would provide needed guidelines and techniques for preventing post-harvest regeneration failures, for intensifying forest management, and for using woody biomass for energy.

Water

National Forest System.--All Alternatives would meet water quality goals (figure 4.24). ^{8/} The Program provides increases for water resource inventory, monitoring, improvement, and land and resource management planning.

Figure 4.18

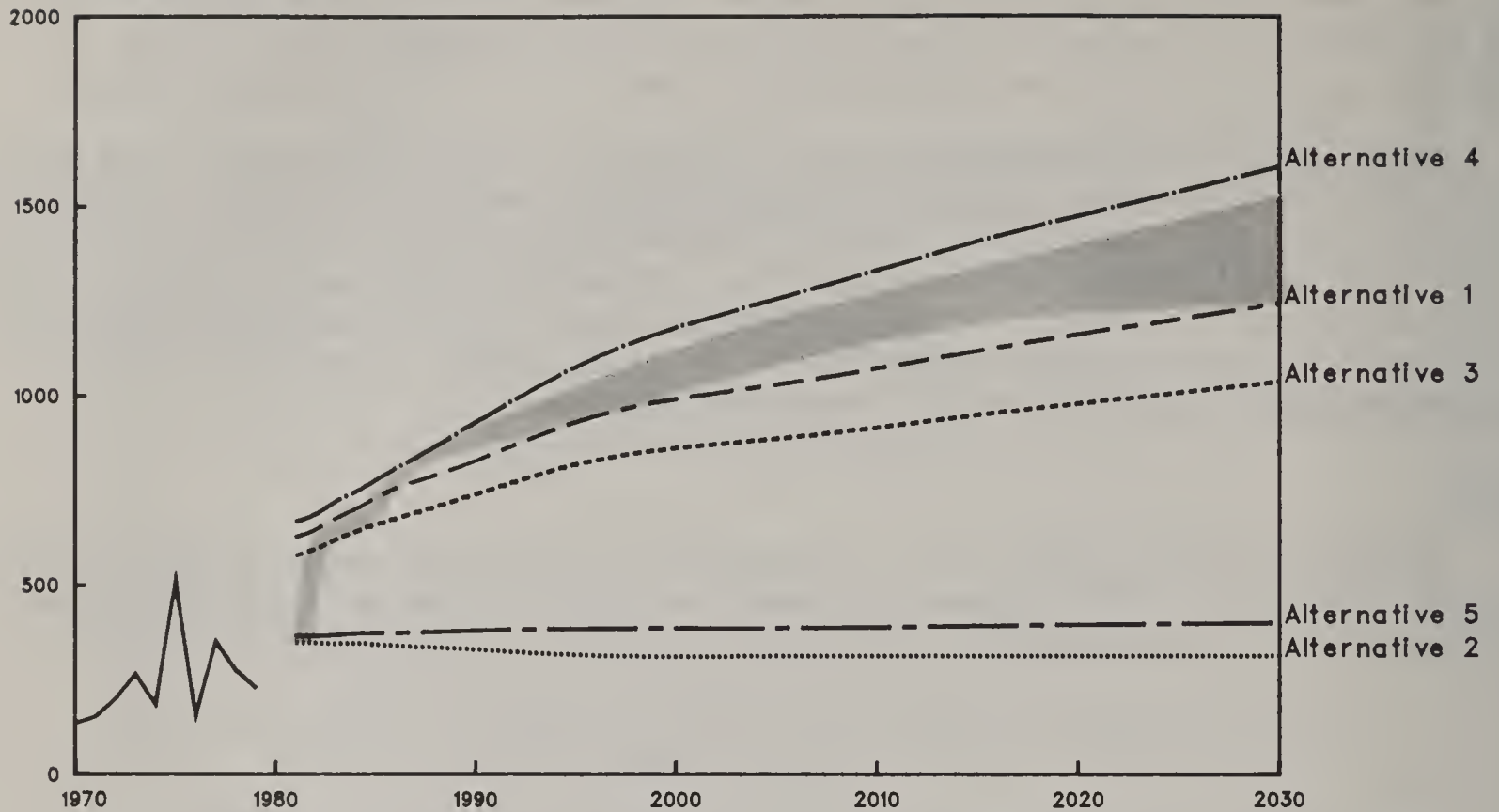


^{8/} Historical data and the current share of projected demand are shown as solid lines, Alternatives as broken lines, and the Program range is shaded.

Figure 4.19

Timber Stand Improvement (S&PF)

Thousand Acres

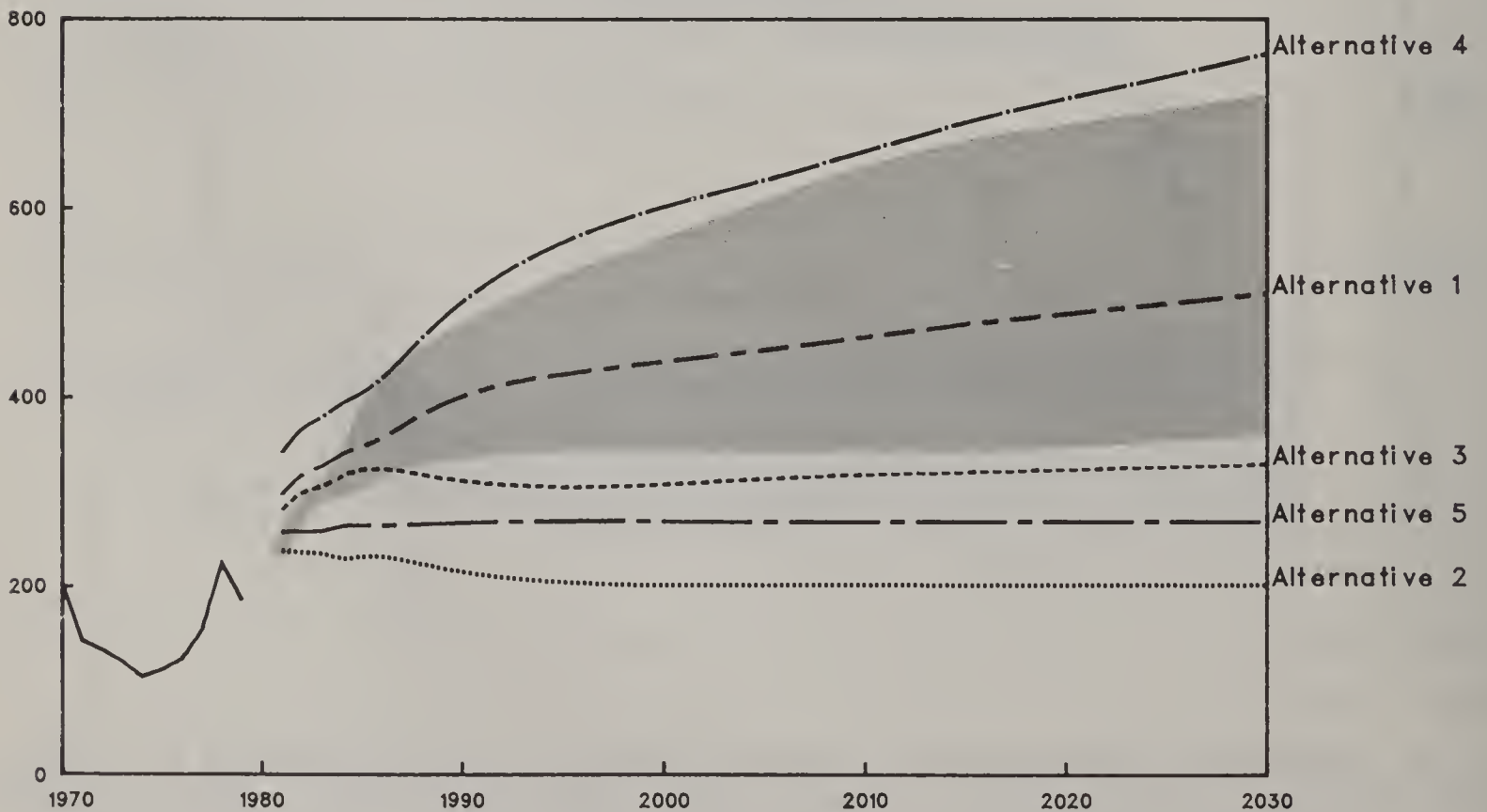


Includes RFA, FIP and ACP

Figure 4.20

Timber Prepared for Harvest (S&PF)

Million Cubic Feet



RFA Only

Figure 4.21

Woodland Owners Assisted (S&PF)

Thousand Owners

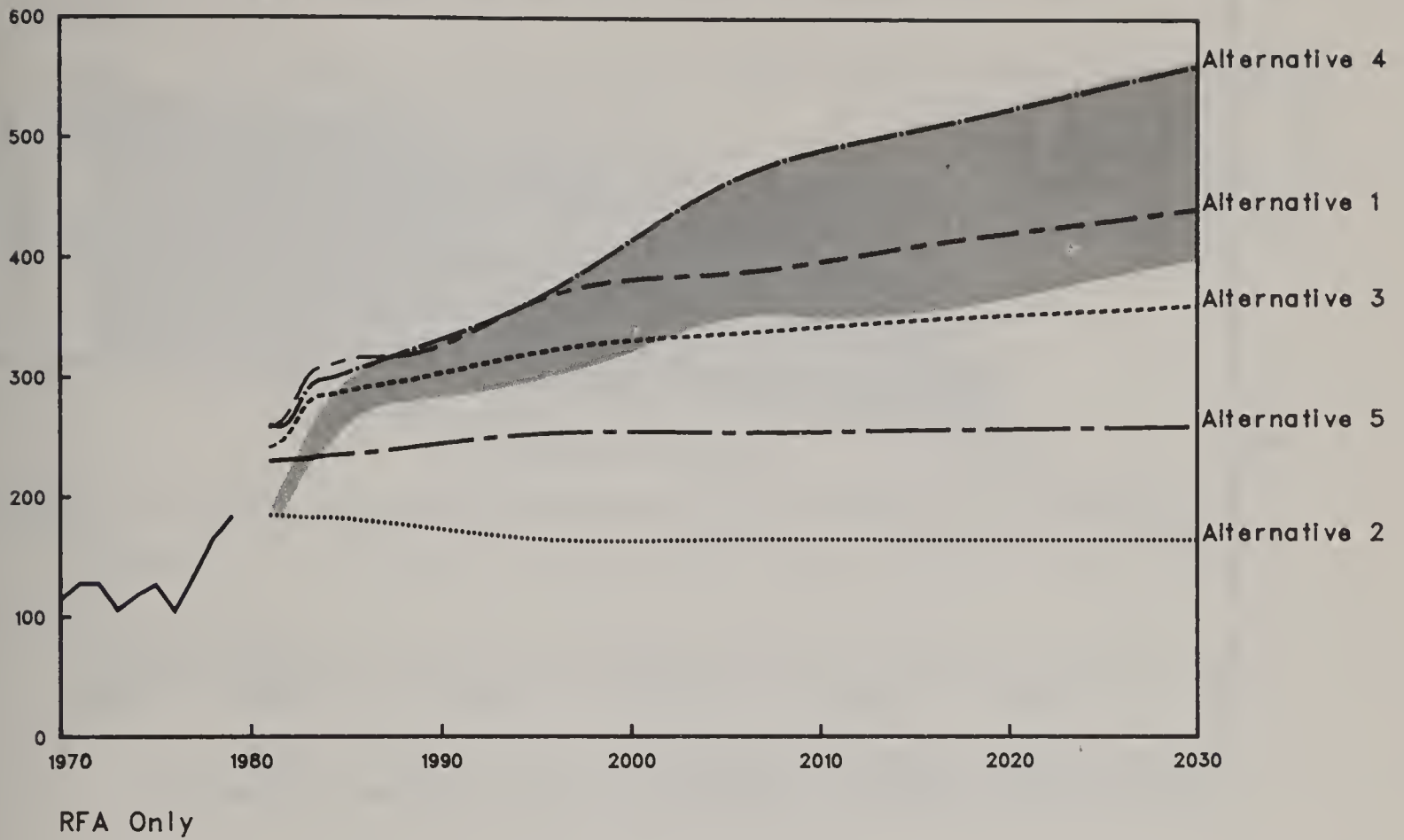
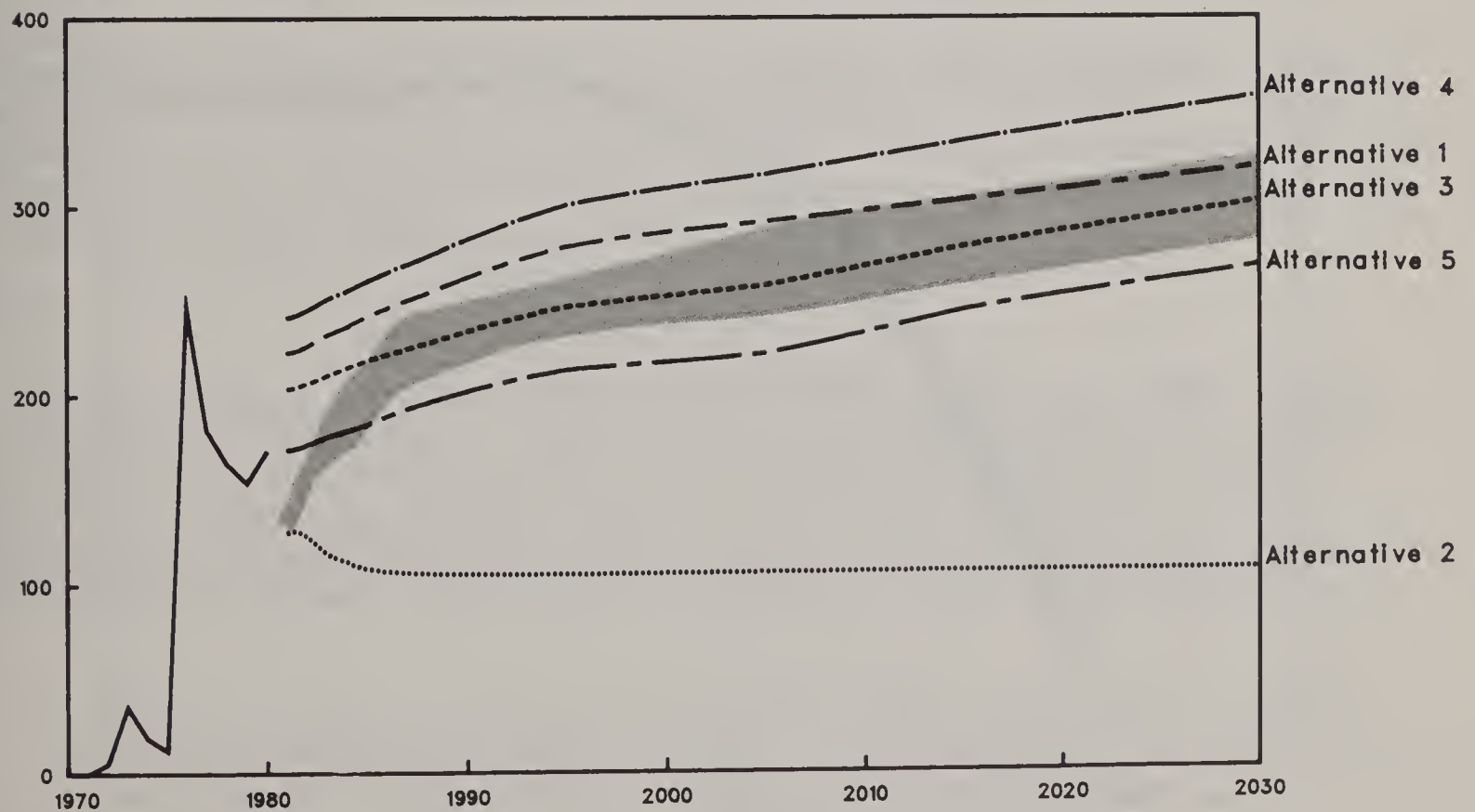


Figure 4.22

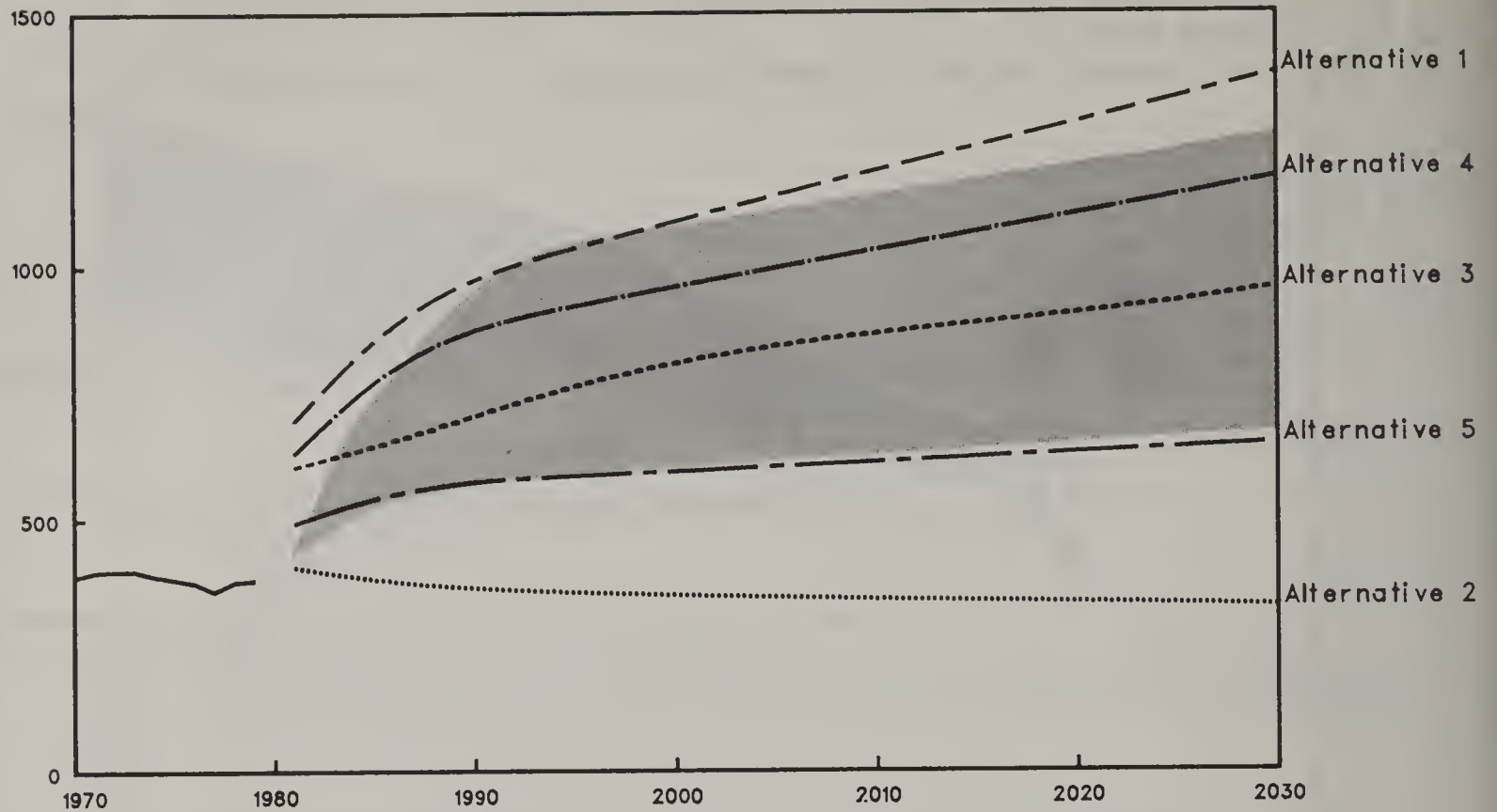
Improved Wood Utilization (S&PF)

Million Cubic Feet



Timber Research

Scientist Years

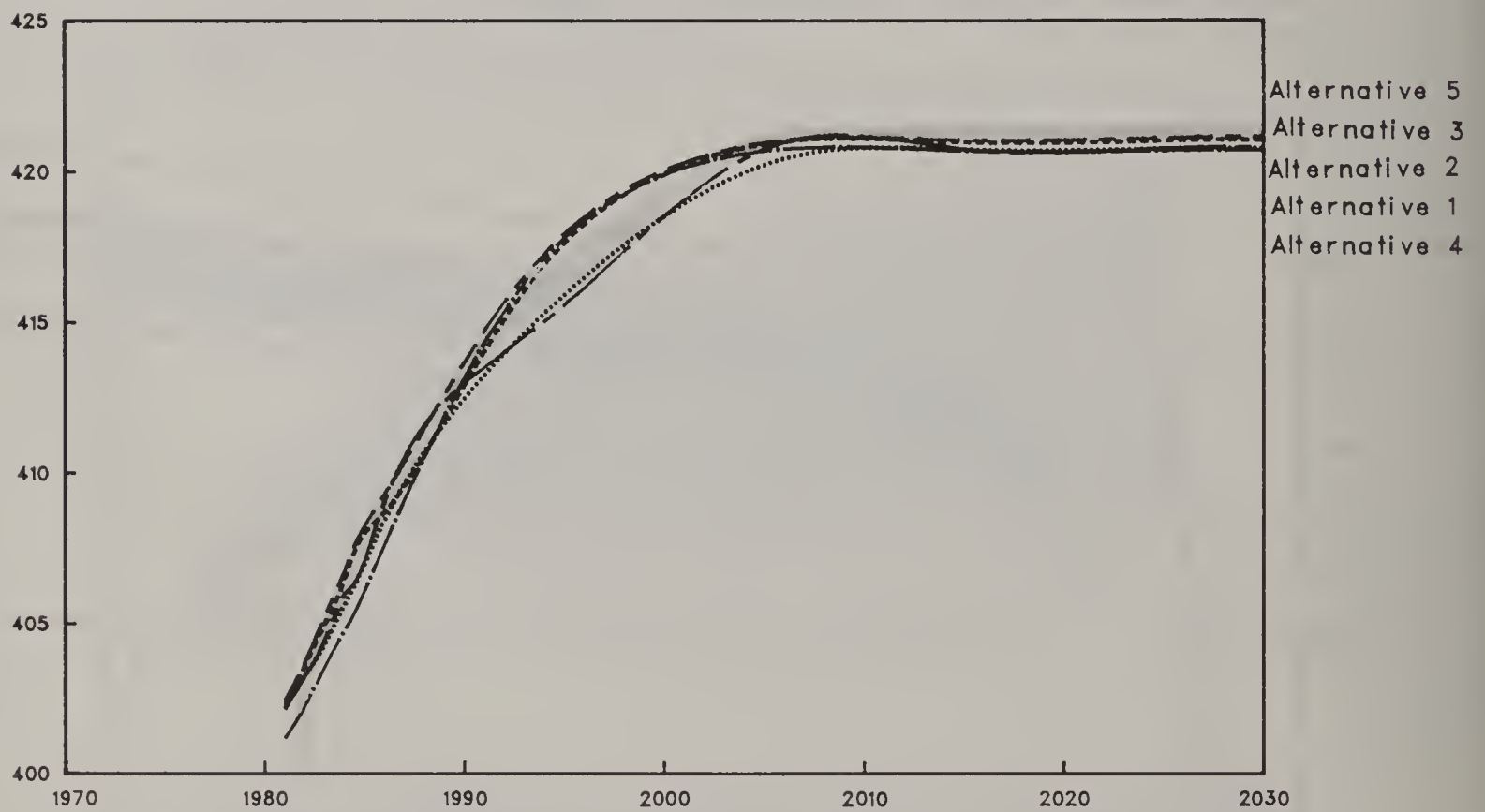


Includes Timber Management Research;
Forest Products Utilization Research; and Forest Engineering Research

Figure 4.24

Water Quality (NFS)

Million Acre Feet



Volume Meeting Water Quality Goals

The objective is to maintain water and environmental quality with increasing production of goods and services. Variations between Regions are primarily related to levels of recreation and timber activities. The High Bound of the Program would provide a greater number of water-yield improvement projects for selected water-short areas than would the Low Bound.

Capital investments in Alternatives 1 and 3 would emphasize increased water yield and improvement of water quality. In Alternative 2, water quality would be maintained, but activities to increase water yield would be reduced. Alternatives 4 and 5 would stress improvement of water quality to keep pace with increases in program activities and would focus on increasing water yields for selected water short areas.

Alternative Program Directions for the
Recommended Program by Region
(1986 and Beyond)

Regions	1	2	3	4	5	6	8	9	10
Recommended Program: High	3	4	3	1	3	3	1	2	1
Low	3	5	5	5	3	5	1	2	2

State and Private Forestry.--Both the High and Low Bounds of the Program would provide technical assistance by Federal personnel to State forestry agencies involved with reclamation of lands affected by surface mining (primarily coal). Forest Service efforts will be coordinated with those of other agencies and will be provided primarily for western Regions with large amounts of surface mining. Alternatives 1 and 4 would have provided higher than recent trend levels of assistance.

Research.--At the High Bound of the Program, water resources research would increase to Alternative 1 by 1995, while at the Low Bound it would increase to above Alternative 5 (figure 4.25). ^{9/} The increase reflects the need for improved management guidelines to meet established water quality goals and to protect forested watersheds.

Minerals

National Forest System.--Both the High and Low Bounds of the Program would speed the processing of applications for mineral permits and leases, and the approval of operating plans, environmental studies, and reports. Activities to supervise mineral operations and reclamation work and to develop energy mineral resources also increase (figure 4.26). ^{9/} The principal difference between the High and Low Bound of the Program would be in

^{9/} Historical data are shown as solid lines, Alternatives are shown as broken lines, and the Program range is shown as a shaded area.

Figure 4.25

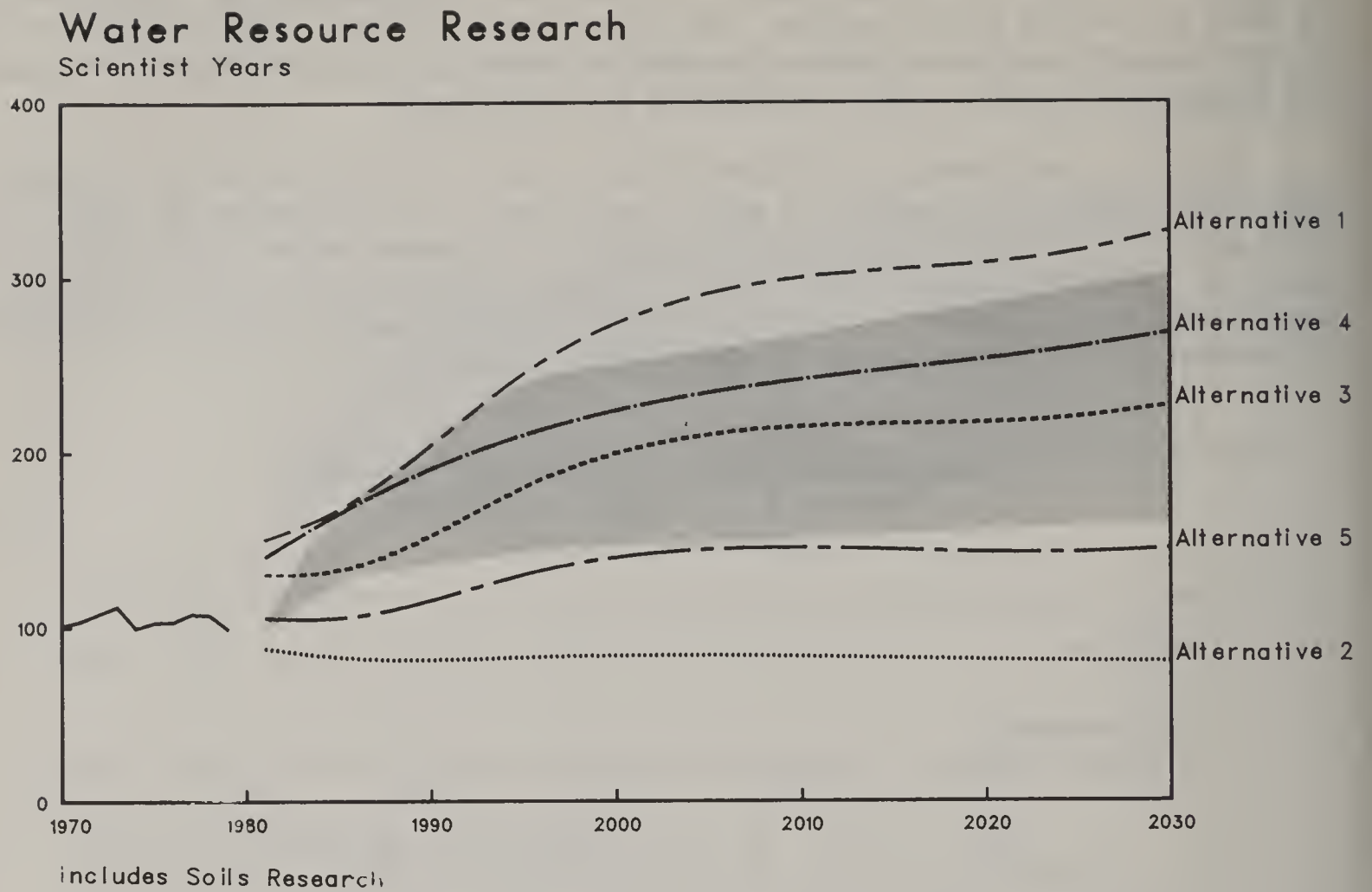
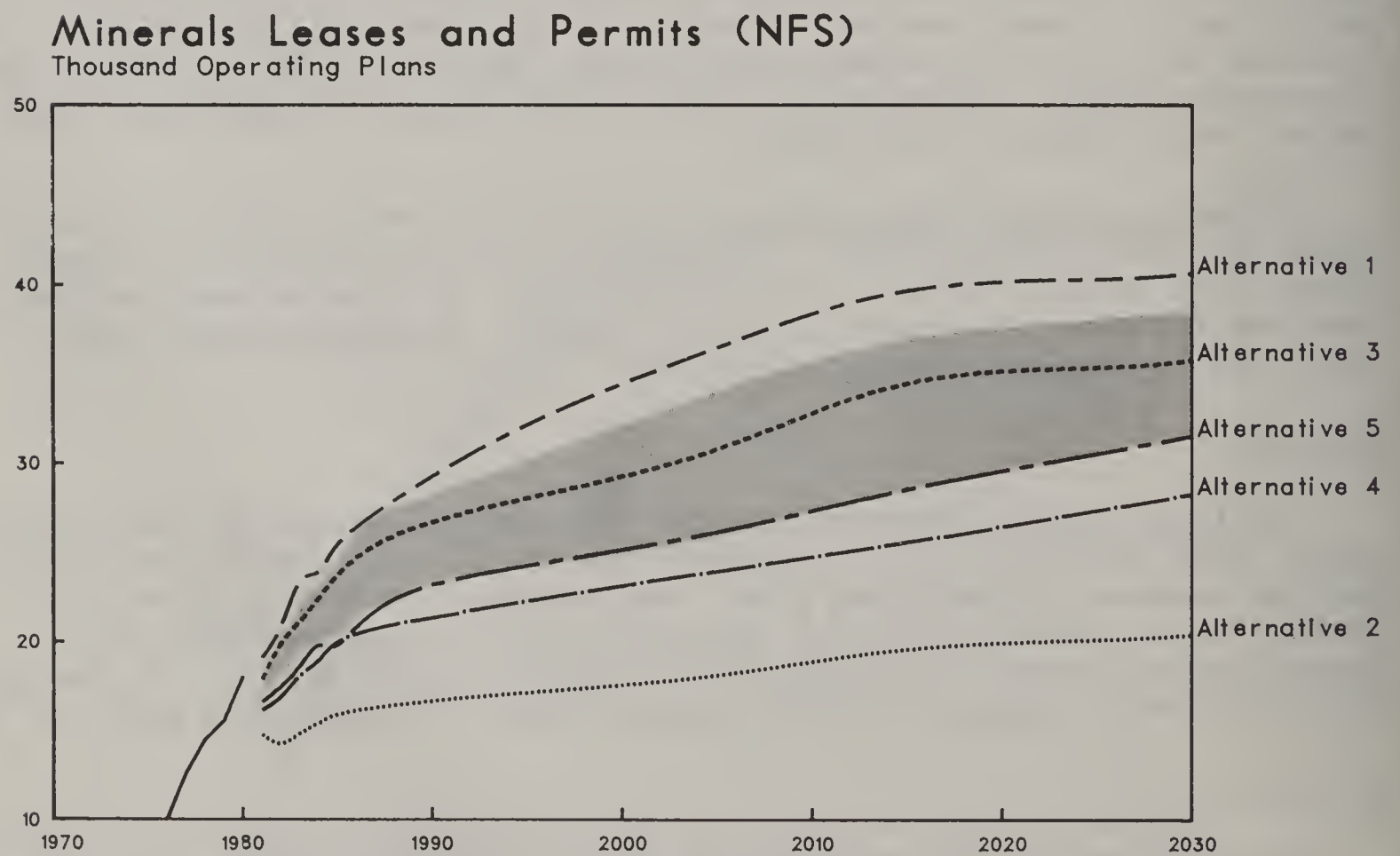


Figure 4.26



a reduction of capability to process permits for minerals activities at the Low Bound.

Alternative 1 would provide the greatest Forest Service effort to facilitate improvements in exploration, development, and mineral removal techniques. It also would insure that mineral potential is considered in resource planning. Such efforts would be reduced under Alternatives 2 and 4 and would remain at or near present levels under Alternatives 3 and 5.

Alternative 1 would also increase efforts to get inactive permits and leases revoked, to examine mineral claims for validity, and to determine mining claim trespasses. Alternatives 2 and 4 would reduce such efforts, while Alternative 5 would maintain recent trends.

Alternative Program Directions for the Recommended Program by Region

Region	1	2	3	4	5	6	8	9	10
Recommended Program: High	1	1	1	1	3	3	1	1	3
Low	5	5	5	5	5	5	5	5	5

State and Private Forestry.--At the High Bound, the Program would slightly increase grants to States for human resource programs in the Southeastern Area and Northeastern Area. The level of assistance would approximate that under Alternative 3, except that a larger program (Alternative 4) would be provided in the South. At the Low Bound, grants to States would be phased out by 1985. The Program discontinues financial assistance to States and local governments for urban and community forestry, but continues to provide technical expertise, guidance, and coordination at the High Bound and technology transfer at the Low. All of the Alternatives except Alternative 2 would continue financial and technical assistance for urban and community forestry. That assistance would be eliminated in Alternative 2.

Research.--At the High Bound of the Program, minerals research would increase to between Alternatives 1 and 4, by 1995 while at the Low Bound it would increase to just below Alternative 5 (figure 4.27). ^{10/} The increases are for technology to rehabilitate surface-mined lands. Energy resources are emphasized.

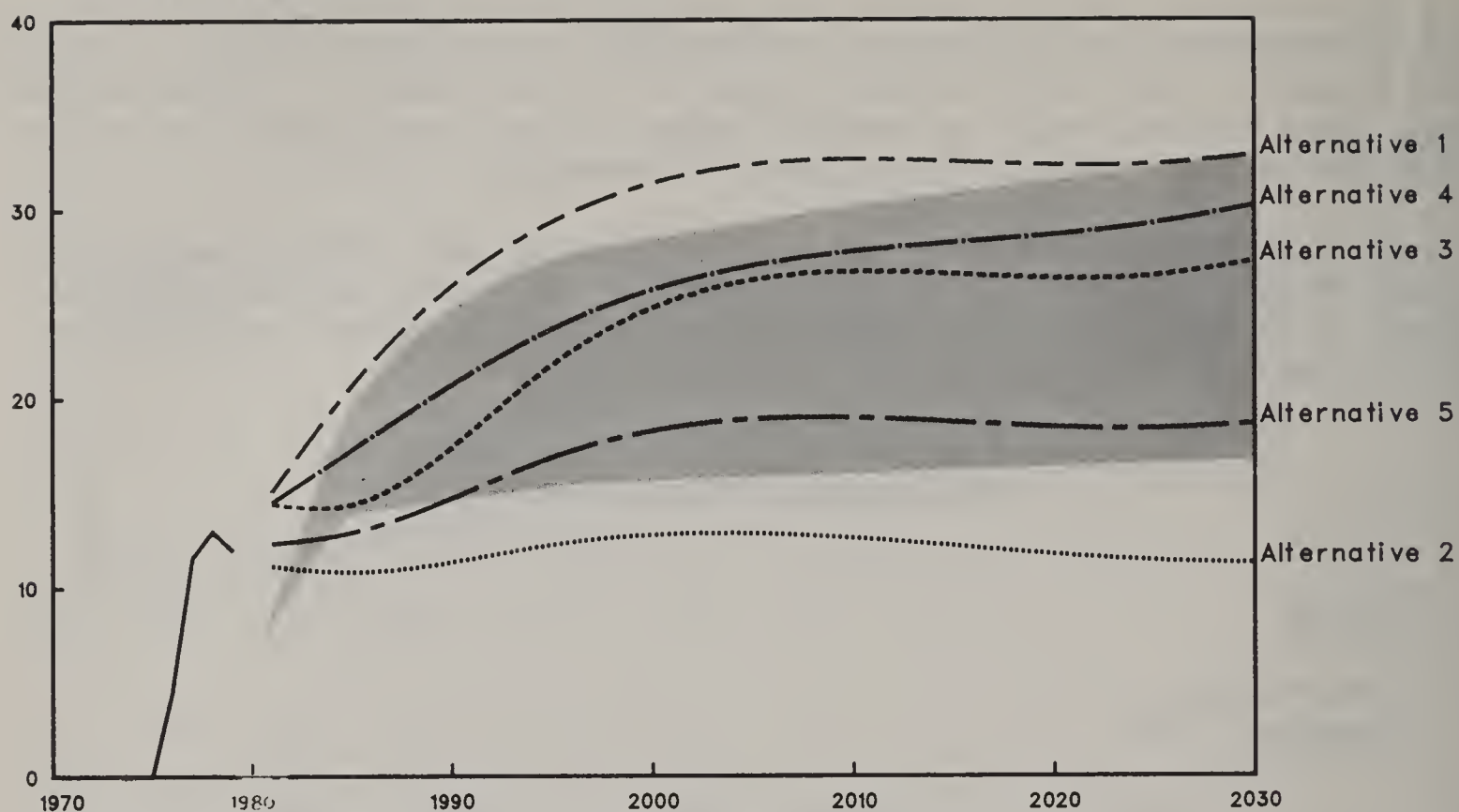
Human and Community Development

National Forest System.--At the High Bound, the Program calls for slightly increased enrollment in existing programs but maintenance of current staffing levels. At the Low, the YCC program would be phased out by 1984. Projections for other programs extend only to 1985 (table 4.3). In contrast to programs in other elements, Alternative 1 would have reduced current human and

^{10/} Historical data are shown as a solid line, Alternatives are shown as broken lines, and the Program range is shown as a shaded area.

Minerals Research

Scientist Years



Includes Surface Environment and Mining (SEAM) Research

Table 4.3.--Human resource programs, 1981-2030. Enrollment in
base year (1978) was 14.8 thousand enrollee years

Alternatives	Annual average 1/						
	1981	1982- 1985	1986- 1990	1991- 2000	2001- 2010	2011- 2020	2021- 2030
(Thousand enrollee years)							
Recommended Program:							
Low	12.0	13.5	0	0	0	0	0
High	16.7	18.5	5.1	5.1	5.1	5.1	5.1
1		9.0	5.1	5.1	5.1	5.1	5.1
2		14.0	.6	.6	.6	.6	.6
3		18.5	9.6	9.6	9.6	9.6	9.6
4		21.2	14.1	14.1	14.1	14.1	14.1
5		16.7	9.6	9.6	9.6	9.6	9.6

1/ Youth Conservation Corps and Volunteers in National Forests only (enrolled years) are included beyond 1985.

community development programs in the National Forest System to a level that would permit re-expansion within 6 months in response to National employment needs. It would emphasize development of cooperative agreements allowing local groups to work on and use National Forest System facilities. Alternative 2 would have moderately increased enrollment for a broad spectrum of the population in labor-intensive programs like the Young Adult Conservation Corps and the Senior Community Service Employment Program, while maintaining or slightly increasing educational and environmental awareness programs like the Job Corps and the Youth Conservation Corps. Alternative 4 would emphasize educational and environmental awareness programs, especially for the disadvantaged.

Research.--At the High Bound, the Program of research on urban and community forestry would increase above Alternative 2 by 1995 while at the Low Bound it would remain below Alternative 2 (figure 4.28). 11/ The increase reflects the need for management guidelines to protect and improve the physical and biological attributes of urban forest resources.

Protection

National Forest System.---In the long run, the Program at both the High and Low Bounds reduces the level of the Fire Management Effectiveness Index (cost plus losses per 1000 acres) at a rate representing most nearly Alternative 5 (figure 4.29). 11/ Alternative 1 would have resulted in the lowest, most favorable index.

Figure 4.30 11/ compares fuel break and fuel treatment activities in the Program with those of the Alternatives. In Alternatives 1, 3, and 4, that work would be completed by 1990. The Program also includes law enforcement to protect resources from destruction and trespass.

State and Private Forestry.--Both the High and Low Bounds would provide modest financial assistance to States for rural fire prevention and control. The High Bound funding would increase gradually before leveling off in 1985, but the Low Bound would remain constant at the 1981 level through 1985 before rising and leveling off in 1995. Special attention would be focused on protecting reforestation investments in the South. Fire losses on protected acres continues near current levels (figure 4.33). 11/ Funding for rural community fire protection is approximately equal to that of Alternative 3 (figure 4.32). 11/ Federal assistance for State forestry agency rural fire prevention and control would be significantly increased under Alternatives 1 and 4. Alternatives 3 and 5 would moderately increase or maintain current levels, and Federal assistance would be discontinued under Alternative 2.

The Program provides funds about equal to Alternative 3 at the High Bound and Alternative 5 at the Low Bound for insect and disease surveys and technical assistance (figure 4.31) 11/, but less for control and special projects. Emphasis would be given to the front range vegetative management in the Rocky Mountain Region and to plantation protection in the South. Insect and disease

11/ Historical data are shown as a solid line, Alternatives are shown as broken lines, and the Program range is shown as a shaded area.

Figure 4.28

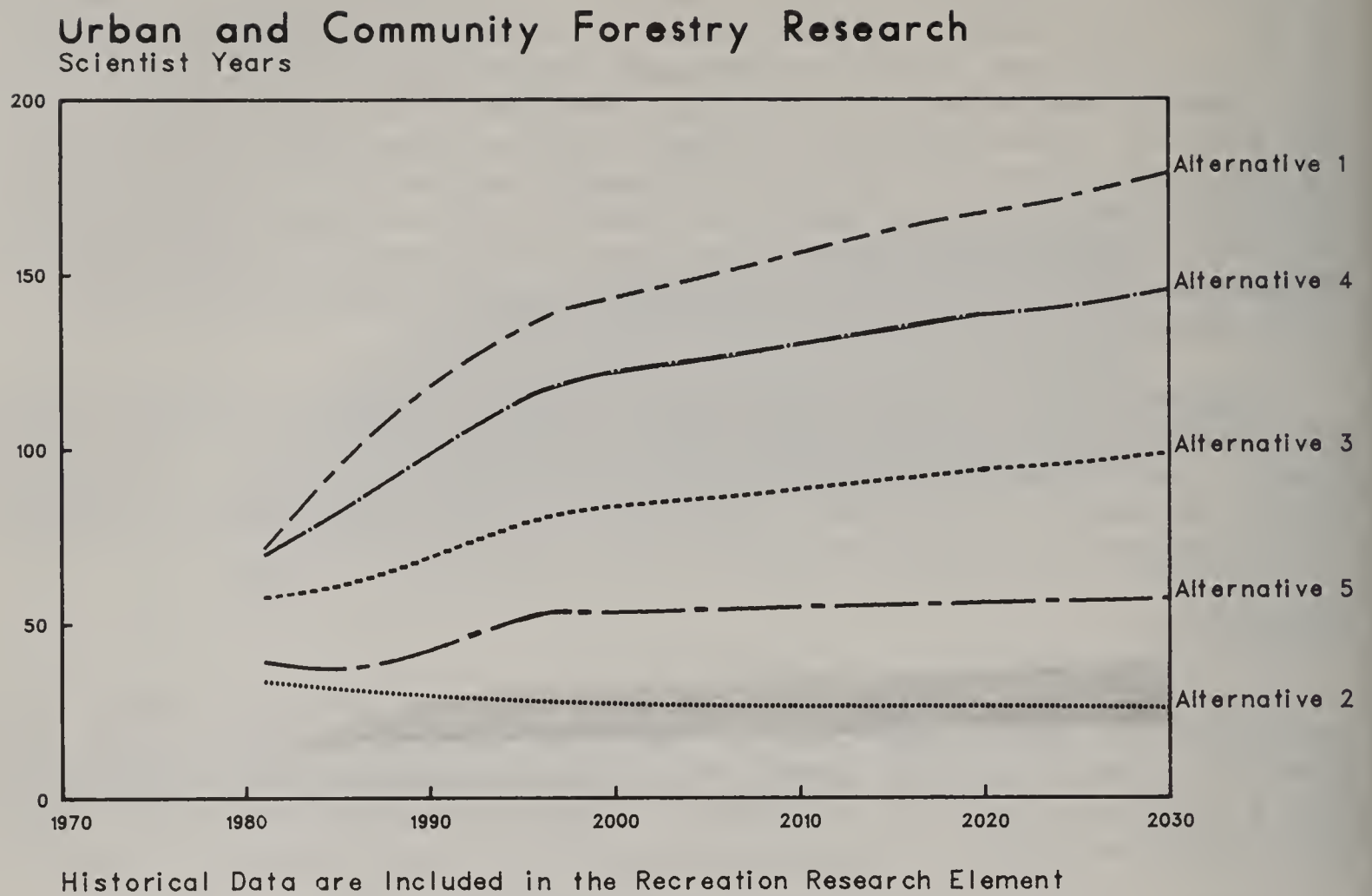


Figure 4.29

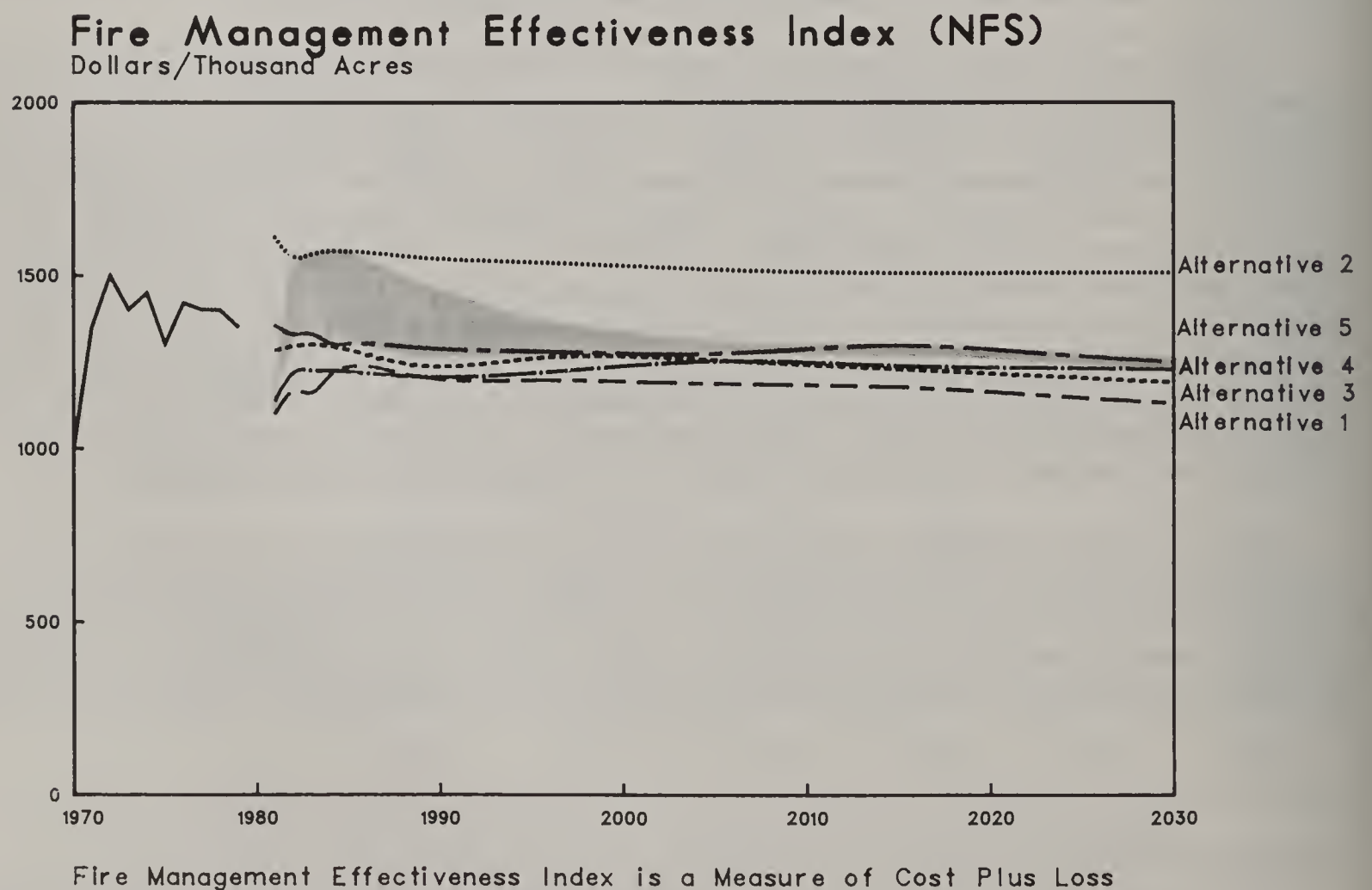
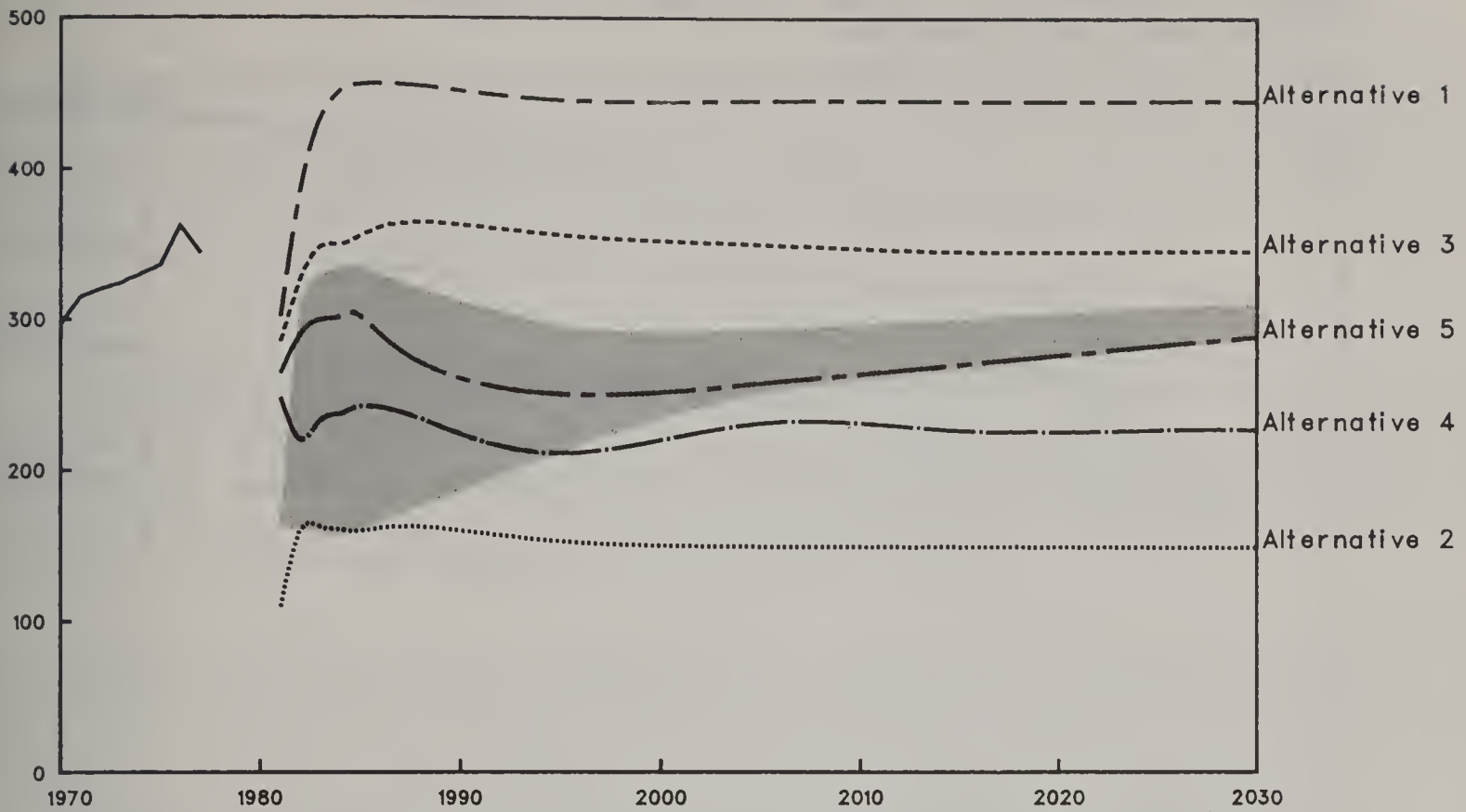


Figure 4.30

Fuelbreaks and Fuel Treatment (NFS)

Thousand Acres

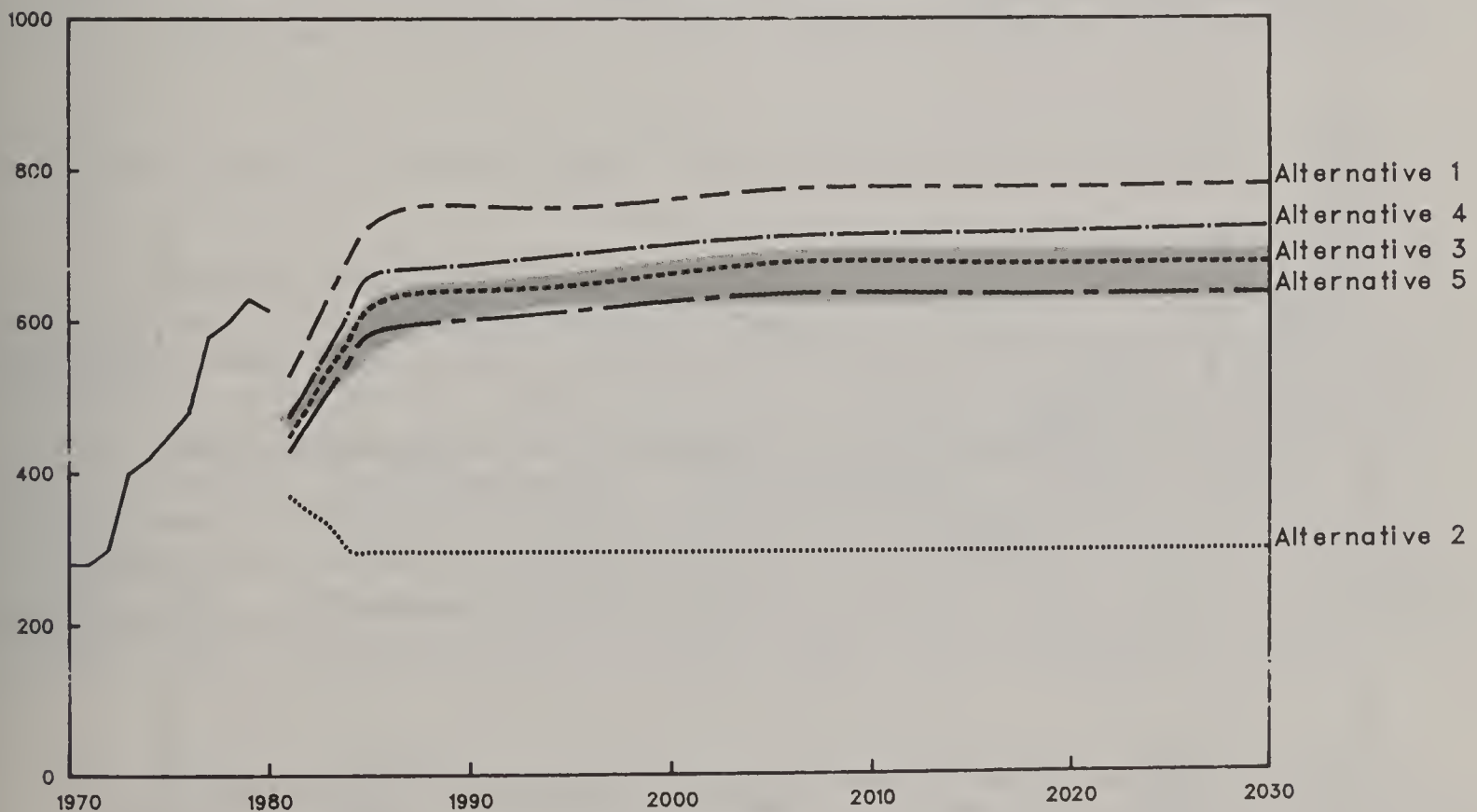


Includes Fuelbreak Construction and Treatment of Natural Fuels
Excludes Treatment of Activity Fuels

Figure 4.31

Insect and Disease Surveys (S&PF)

Million Acres



Includes Surveys for All Forest Lands: Federal, State, Private

Figure 4.32

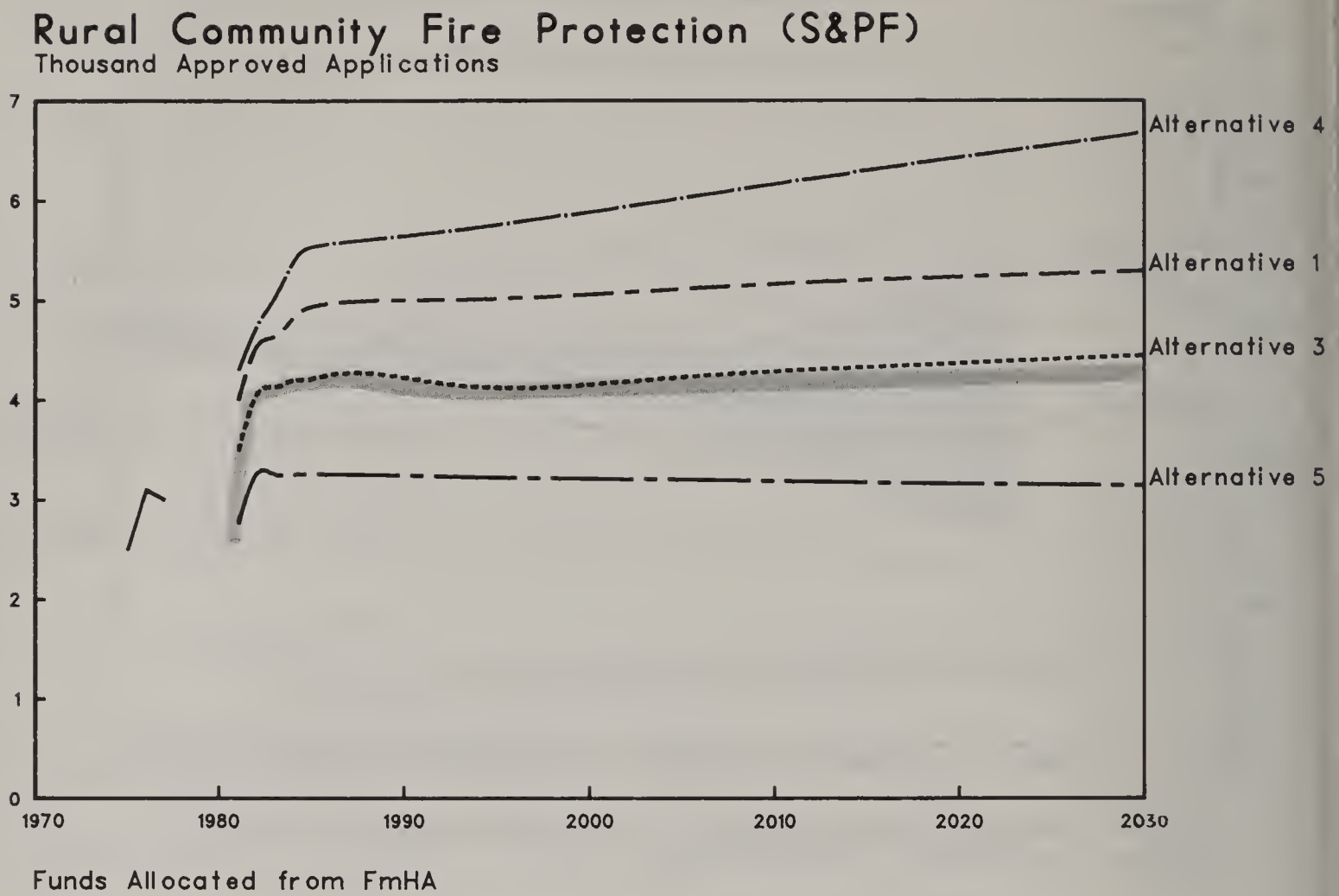
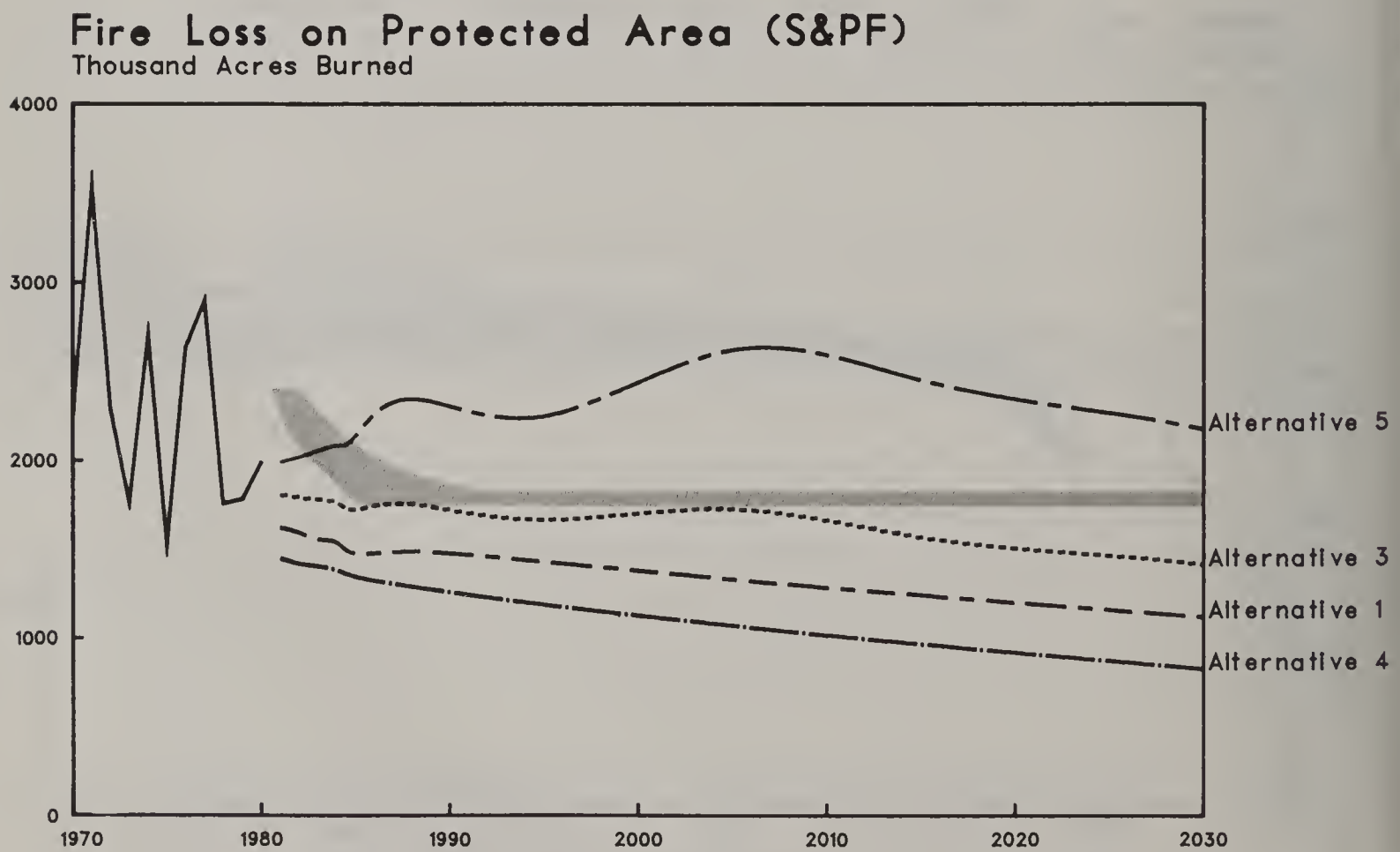


Figure 4.33



activities would be significantly increased under Alternatives 1 and 4, moderately increased under Alternative 3, and increased slightly under Alternative 5. Insect and disease activities would be significantly reduced under Alternative 2.

Research.--At the High Bound of the Program, protection research would increase to between Alternatives 4 and 1 by 1995 while at the Low Bound it would be slightly below Alternative 5 (figure 4.34). 12/ The Program reflects the need for improved methods to protect forest and rangelands from diseases, insects, fire, and unwanted vegetation.

Lands

National Forest System.--Both Bounds of the Program and all Alternatives provide for completion of land and resource management plans by the October 1985 completion date, as required by the National Forest Management Act. However, planning would be accelerated and would be more intensive for Alternatives 1, 3, and 5 and the High Bound of the Program.

Under the High Bound of the Program, land purchases to protect critical watersheds and restore land productivity, especially in eastern National Forests, will increase using Weeks Act funding (figure 4.35). 12/ Land purchases using the Land and Water Conservation Fund would continue at a high level until that program ends in 1989 in all Alternatives. At the Low Bound, land adjustment, land line location, and other lands activities would increase at a slower rate.

Estimated Land and Water Conservation Fund purchases 1/

	(thousand acres per year)			
	<u>1981</u>	<u>1982</u>	<u>1983-85</u>	<u>1986-89</u>
National total	186	166	164	274

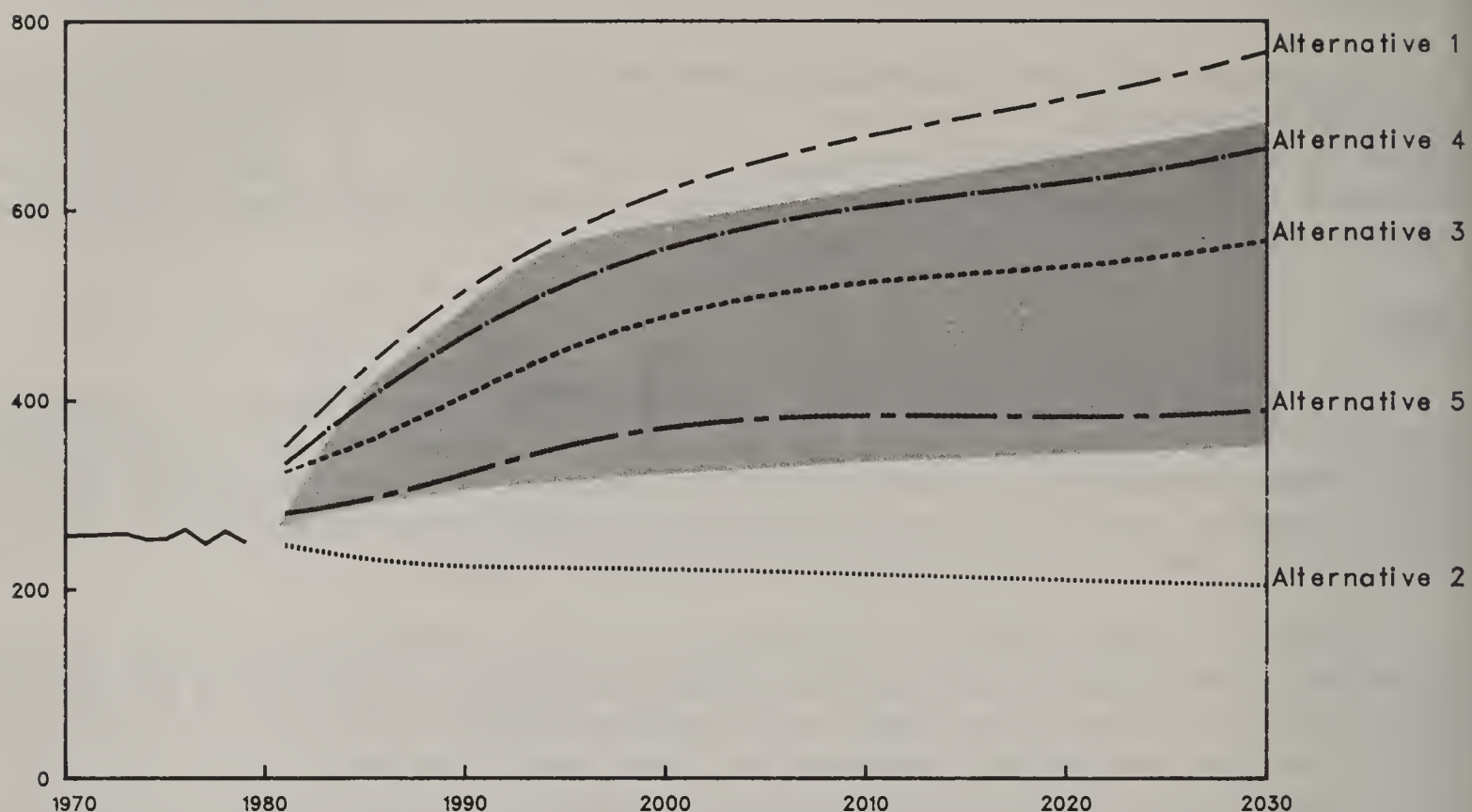
1/ Administered by the Heritage Conservation and Recreation Service USDI.

The Program and Alternatives 1, 3, 4, and 5 would accelerate landline location and status work to minimize innocent trespass. At the same time, increased survey and status investigation would reveal previously undetected trespass, increasing the work required in trespass and title claims. The Program and Alternatives 1, 3, 4, and 5 would also provide for completion of backlog landline location by year 2000--50 percent of all landline location needed--and the remainder by the year 2020. Alternative 2 would complete only 40 percent of the landline location backlog by year 2020 and 95 percent by year 2030. Occupancy trespass backlog, 45,000 cases, would be eliminated by year 1990 in Alternative 1, by year 2000 in Alternatives 3 and 4, by year 2010 in Alternative 5, and 90 percent by year 2030 in Alternative 2.

12/ Historical data are shown as a solid line, Alternatives are shown as broken lines, and the Program range is shown as a shaded area.

Protection Research

Scientist Years

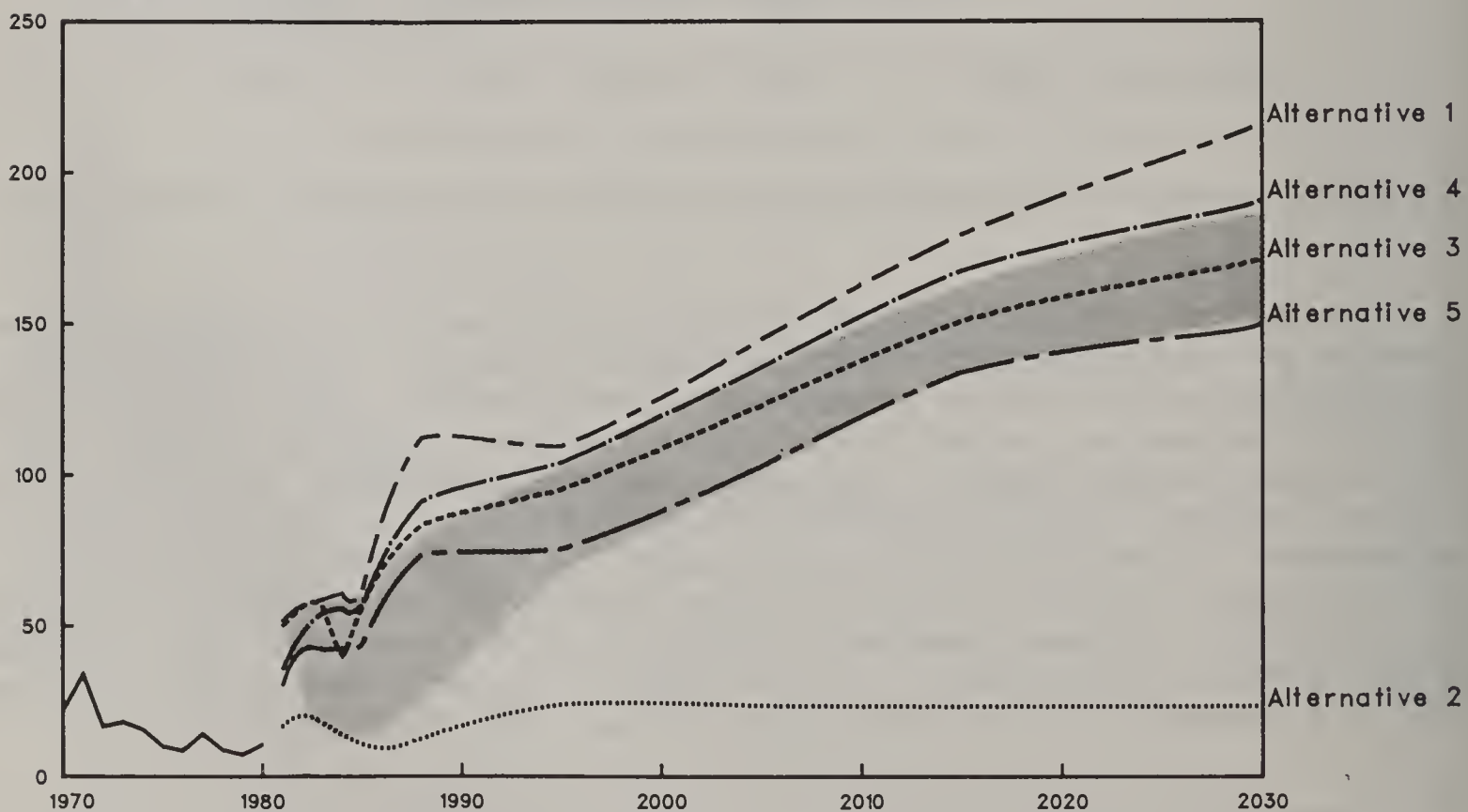


Includes Fire and Atmospheric Sciences Research;
Forest Insect and Disease Research

Figure 4.35

Land Purchase and Acquisition (NFS)

Thousand Acres



Weeks and Special Acts Only
Excludes Land Exchanges

State and Private Forestry.--Under both the High and Low Bounds of the Program, increased assistance would be provided to States for the preparation of State forest resource plans (figure 4.36). ^{13/} This assistance would be low under Alternative 2, increasing in Alternatives 5, 3, 1, and 4. Both Bounds of the Program would also increase technical assistance to individual nonindustrial private landowners for the development of multiresource forest management plans (figure 4.37). ^{13/} Alternative 2 would provide a low level of assistance, Alternatives 5 and 3 would provide moderate levels, and Alternatives 1 and 4 would provide high levels of assistance.

Research.--At the High Bound of the Program, lands research would increase to Alternative 1 by 1995 while at the Low Bound it would increase to slightly below Alternative 3 (figure 4.38). ^{13/} The Lands element includes research in forest economics, renewable resource evaluation, land management planning, international forestry and competitive grants for basic research. The increases reflect the need for detailed information, for improved methods of measuring and forecasting demands, and for improved land management planning methods.

Soils

National Forest System.--Both Bounds of the Program provide for increases in soil resource inventory, monitoring, improvement, and land management planning. The objective is to support increases in commodity production while maintaining soil and environmental quality. The Low Bound, however, would provide primarily for maintenance rather than improvement of the soil resource.

Capital investments in Alternatives 1 and 3 would stress increases in natural soil productivity to help meet the high demands for forest resources (figure 4.39). ^{13/} In Alternative 2, resource improvements would be limited to treating damaged soils to return them to natural productivity and prevent further deterioration. Resource improvements in Alternatives 4 and 5 would stress maintenance of natural soil productivity with selected projects to increase soil productivity.

State and Private Forestry.--Both the High and Low Bounds of the Program and Alternatives 1 and 4 would increase technical assistance and training in soil data interpretations for forest management purposes to State Foresters or equivalent State officials and they in turn would provide the same services to owners and managers of private forest lands. This type of assistance would be moderately increased under Alternative 3 and continued at present low levels under Alternative 5. Under Alternative 2, soil data interpretations would be available only on a very limited incidental basis and only as needed for soil resource protection in high-value areas.

Inventory data on the identification of prime forest land, based upon soil productivity and other characteristics, is required for the development

^{13/} Historical data are shown as a solid line, Alternatives are shown as broken lines, and the Program range is shown as a shaded area.

Figure 4.36

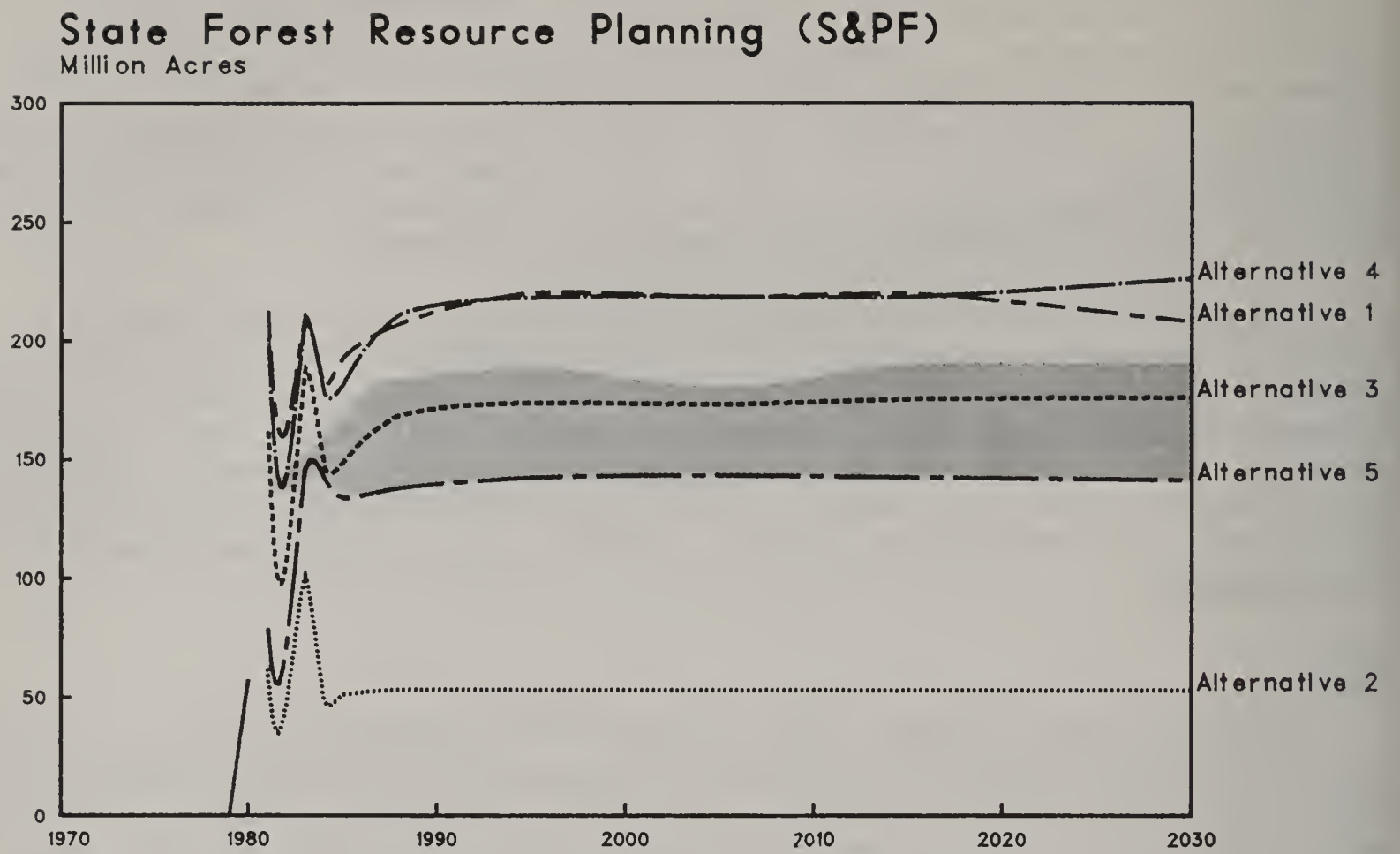


Figure 4.37

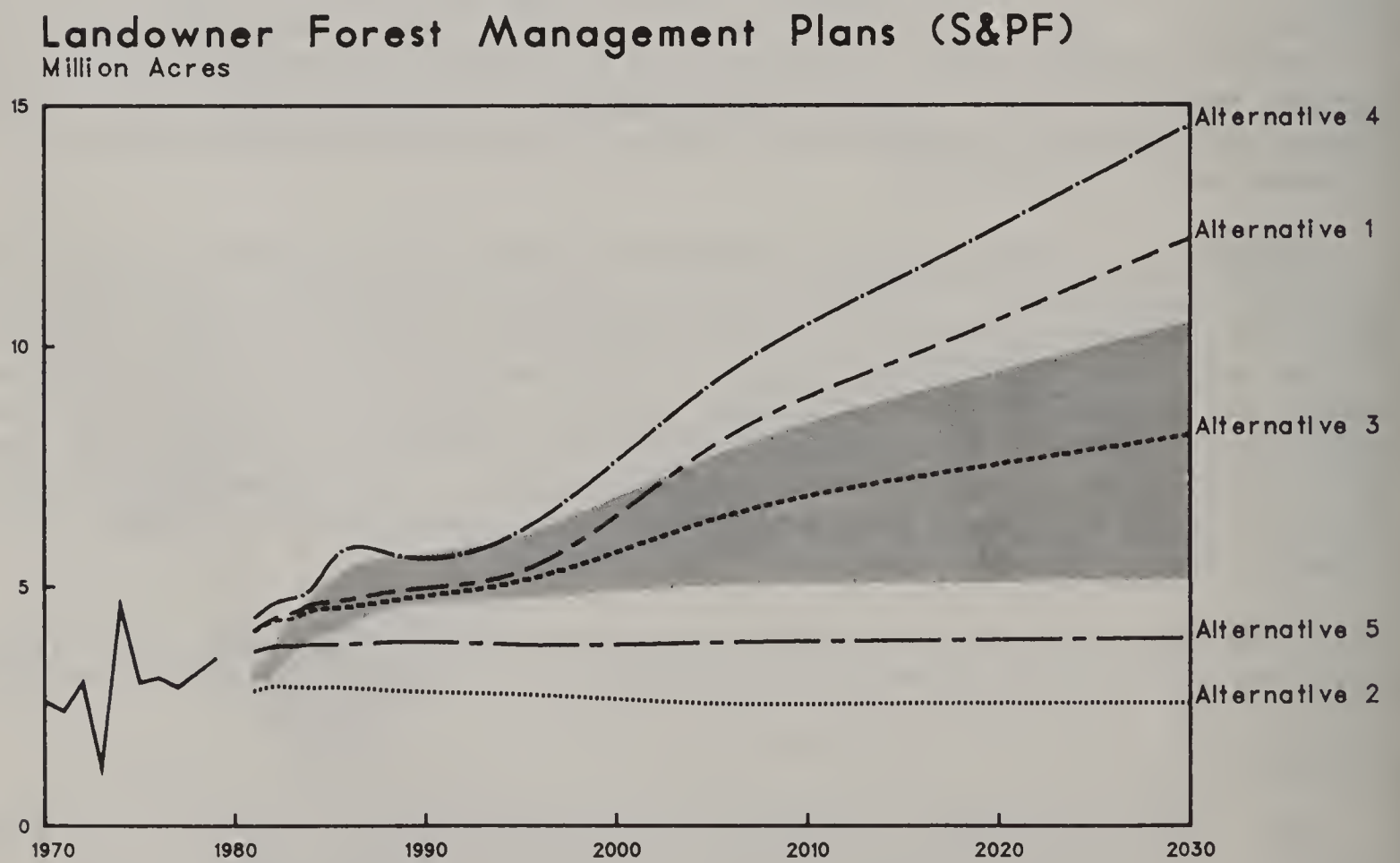


Figure 4.38

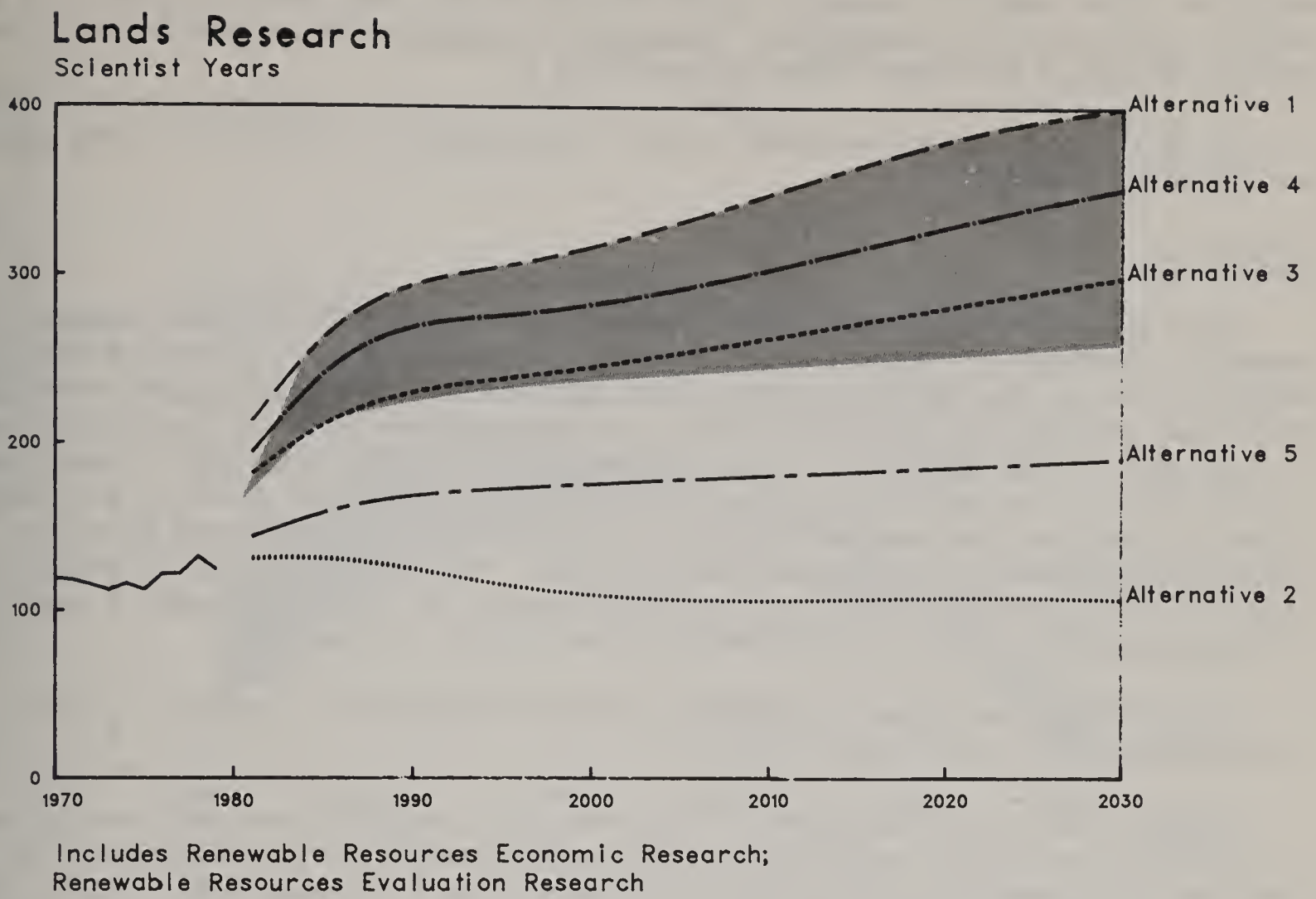
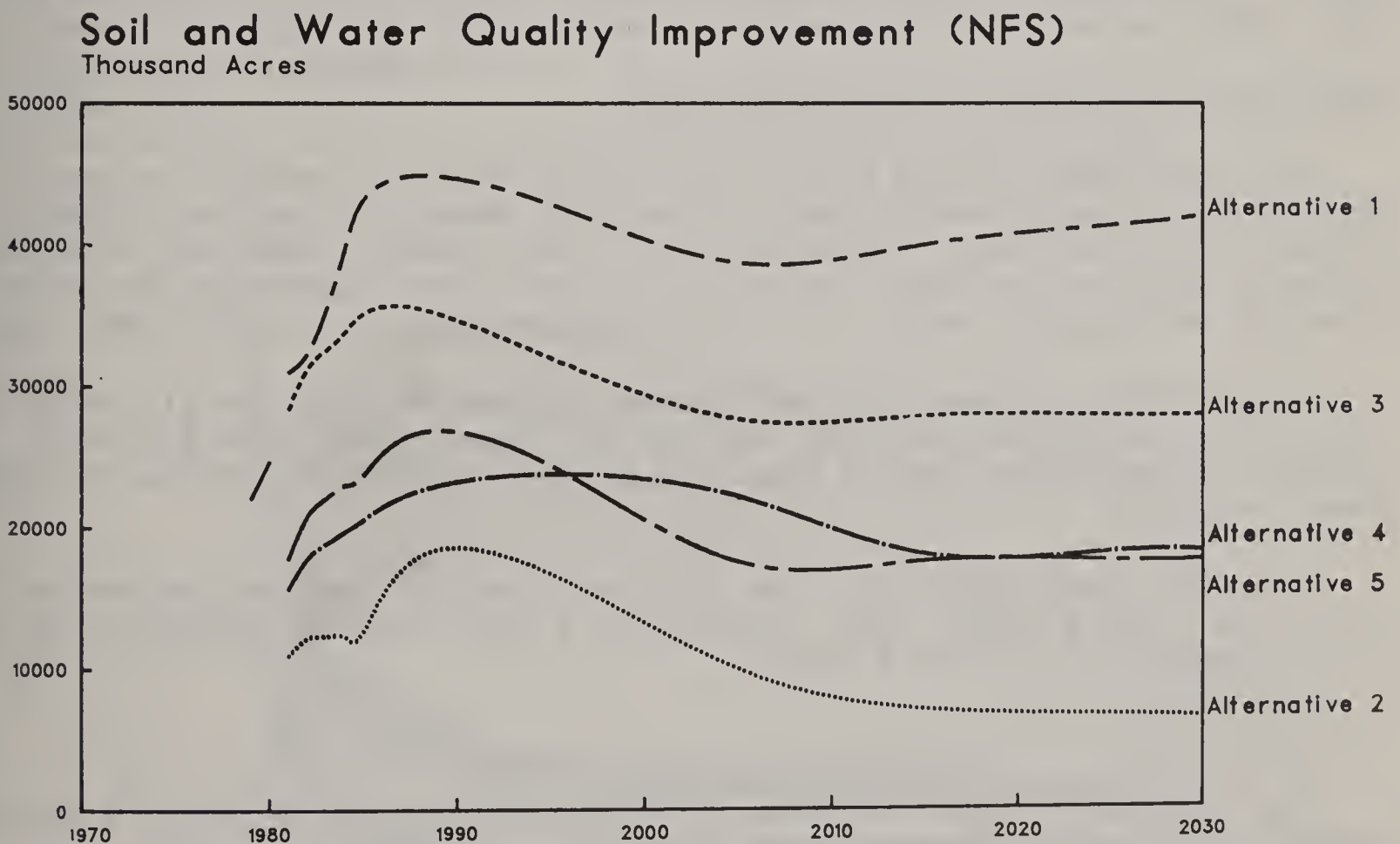


Figure 4.39



of State forest resource plans described in the Lands element. This activity would be given special emphasis under Alternative 1 and the High Bound of the Program. No special cooperative technical assistance for prime forest land mapping would be provided under Alternative 2.

Research.--Research related to soil management is included in the water and timber elements.

Facilities

National Forest System.--Both Bounds of the Program includes support for moderate increases in market and nonmarket outputs. New legislation and implementation plans for health, safety, and welfare of forest users and employees have been included at the High Bound. A detailed analysis of facilities needs is included in the appendix. The Program complies with the basic requirements of legislative and administrative direction for health and safety, and provides for new and replacement facilities consistent with growing resource program requirements. Arterial and collector road construction is shown in figure 4.40. ^{14/} The level of facility support at the Low Bound is consistent with the overall activity level of the resource elements.

Significant increases in housing and work centers to reduce air travel are included for the Alaska Region.

Region.--At the High Bound of the Program, construction and maintenance of research facilities would rise to above Alternative 1 by 1995, while at the Low Bound they would be equivalent to Alternative 5 (figure 4.41). ^{14/} The increase by 1985 reflects the need for some research construction to support an expanded effort in natural resources research in the Forest Service and the need for maintenance, energy retrofit, and provision for access by handicapped people. Costs decline after highest priority construction is completed by 1985; funds thereafter are primarily for maintenance and energy conservation.

Comparison of Program Costs and Work Force

National Forest System appropriated funds would continue to increase at close to the trend of recent years at the High Bound, but decline slightly through 1985 at the Low. Increases greater than recent trends are recommended in the early years for State and Private Forestry and Research at the High Bound and near recent trends at the Low (figures 4.42, 4.43, and 4.44). ^{14/}

Alternative 1 exceeds the Recommended Program in costs for all three program areas, and Alternative 2 is less for all three. For State & Private Forestry, Alternatives 3 and 4 also have greater funding levels than the Recommended Program.

Personnel requirements for the Program after 1985 grow in conjunction with costs (figure 4.45). ^{14/} Alternative 1 would require substantially larger increases, Alternative 2, less.

^{14/} Historical data are shown as a solid line, Alternatives are shown as broken lines, and the Program range is shown as a shaded area.

Figure 4.40

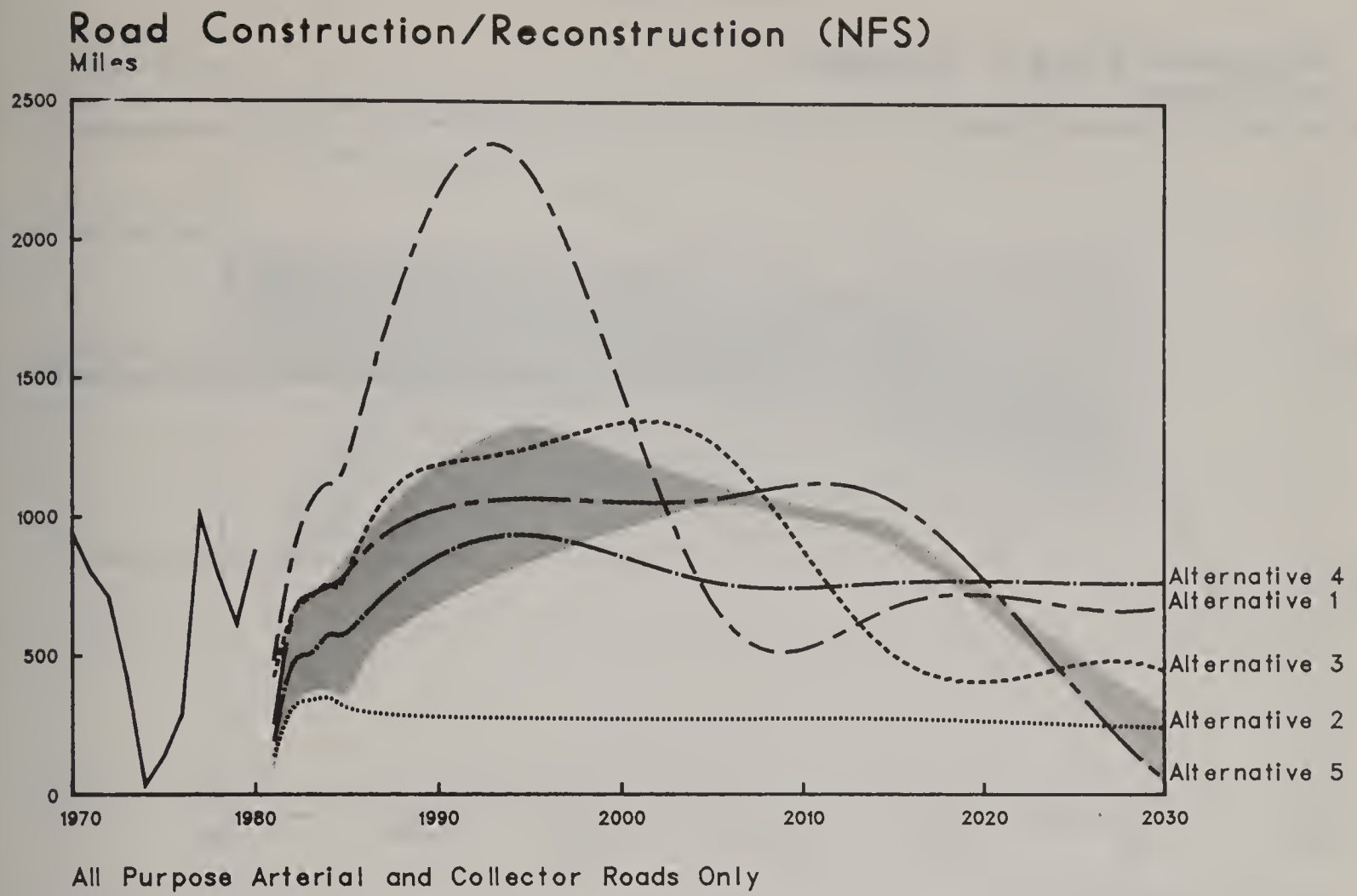


Figure 4.41

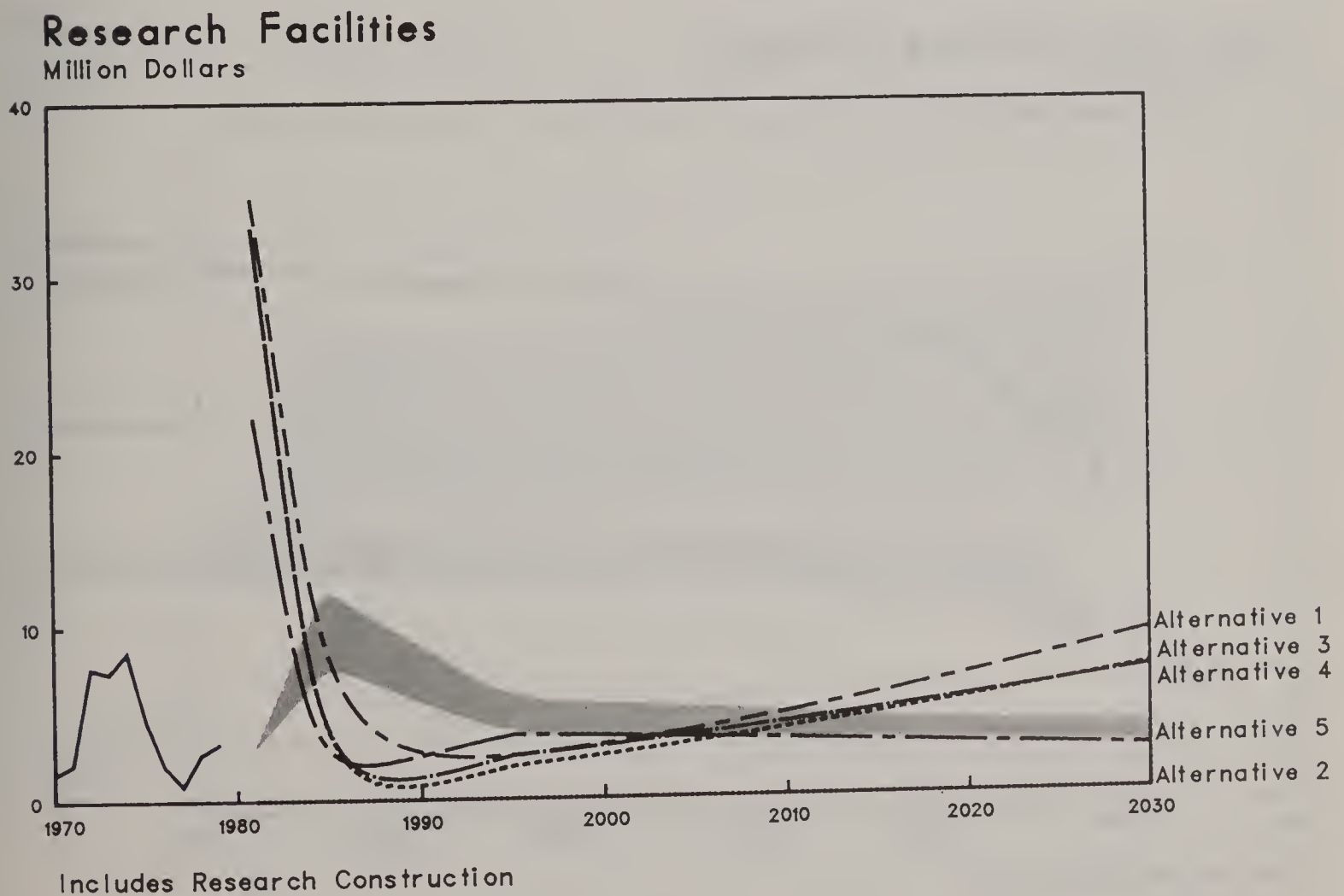


Figure 4.42

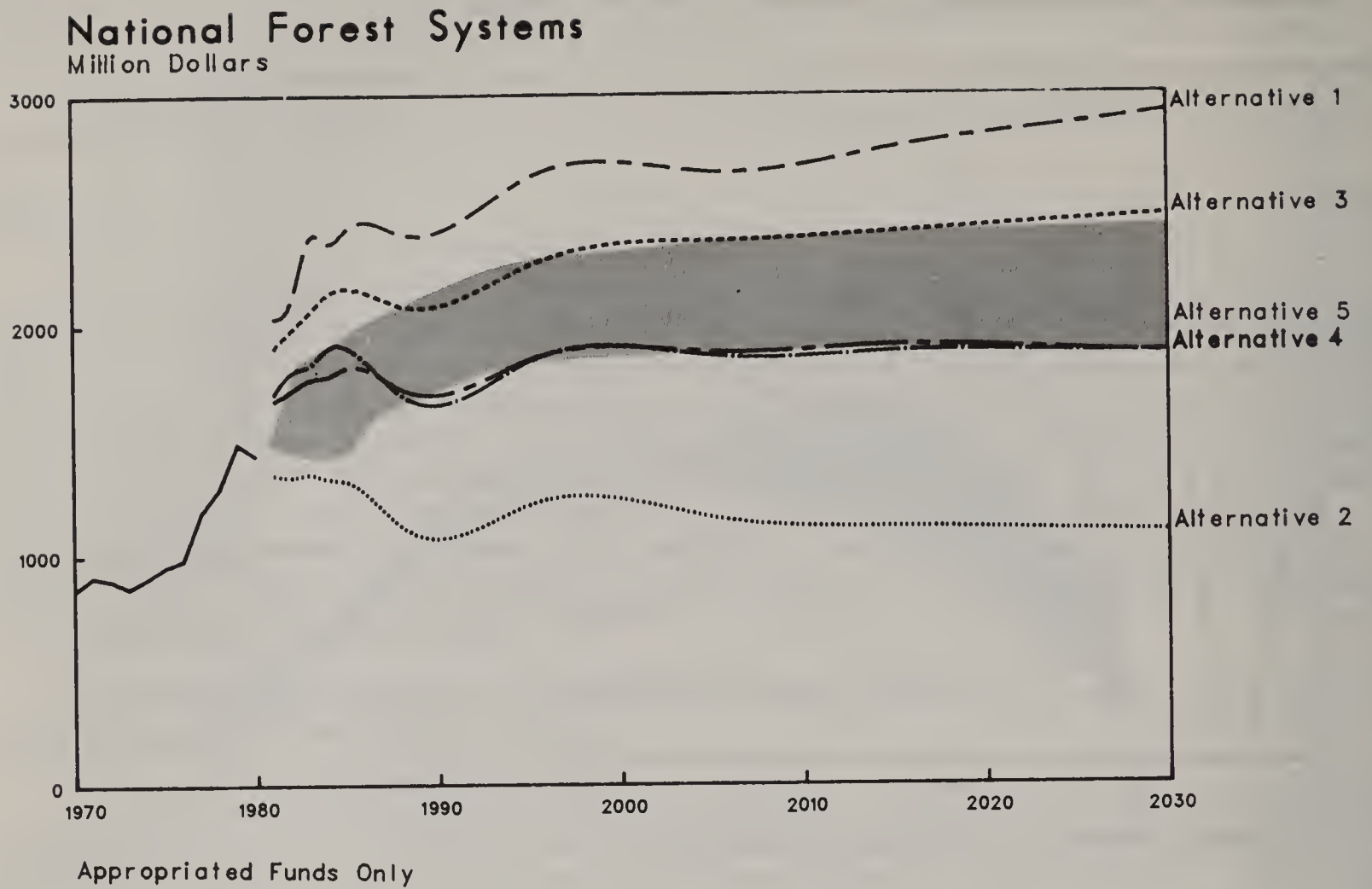


Figure 4.43

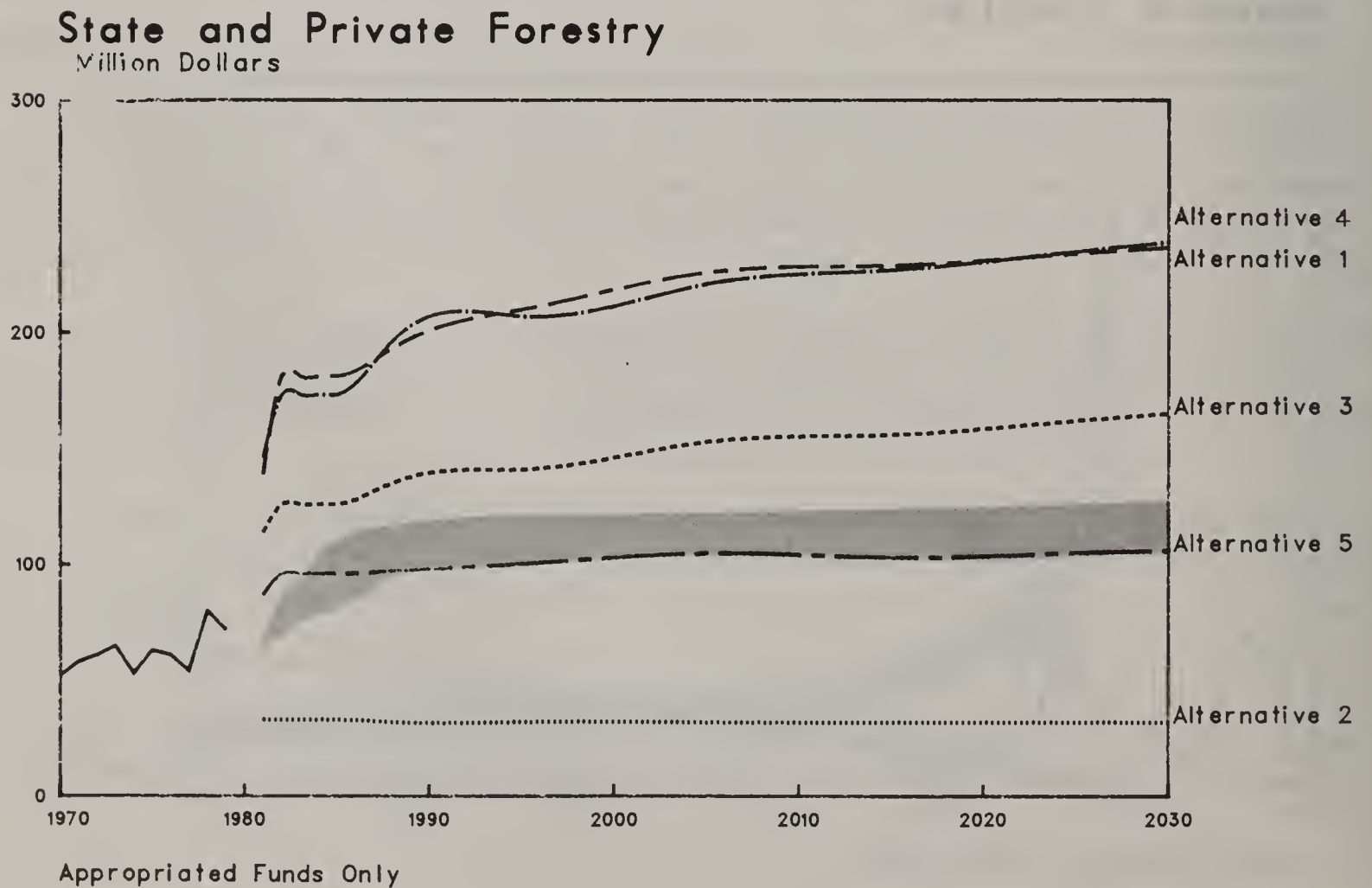


Figure 4.44

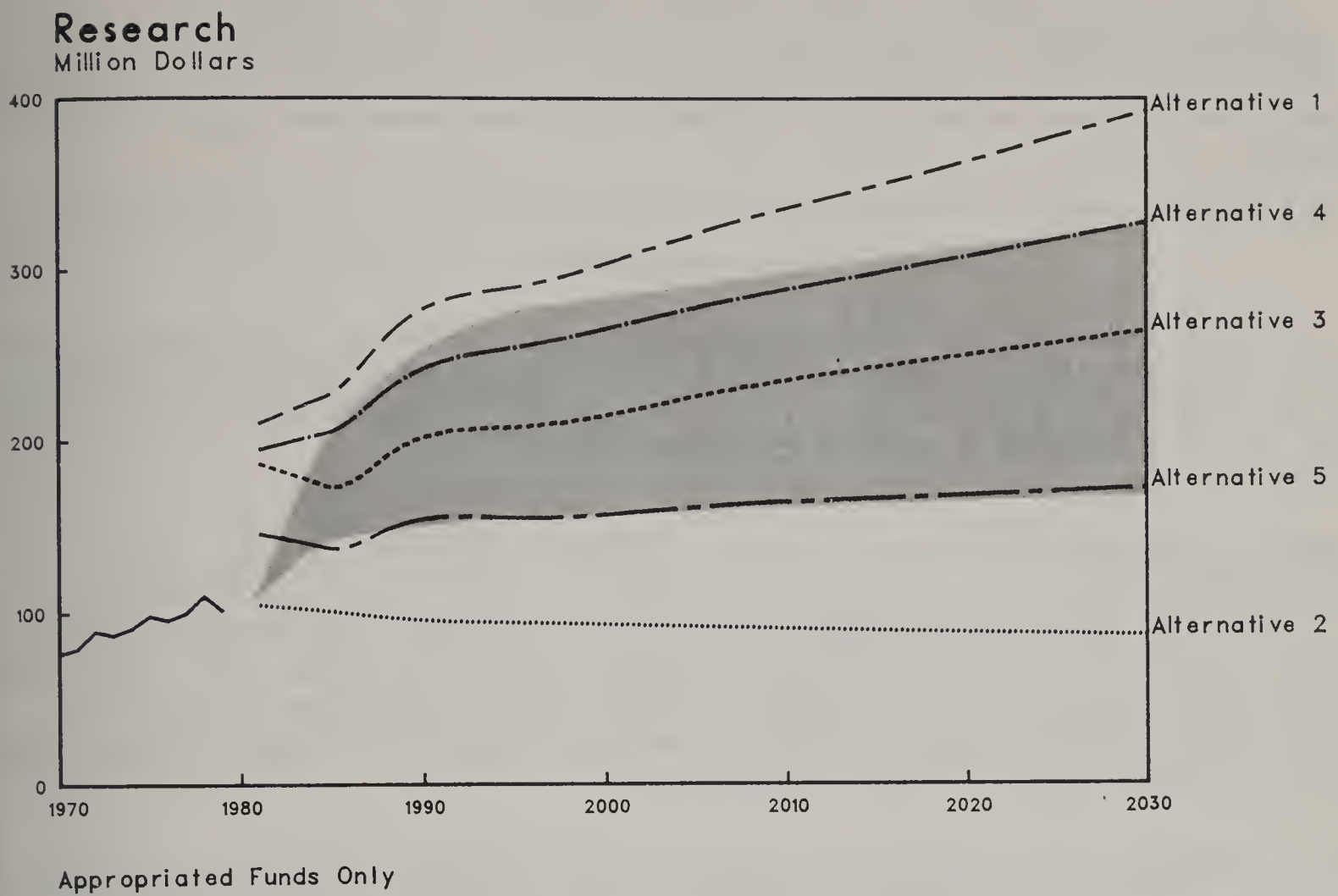
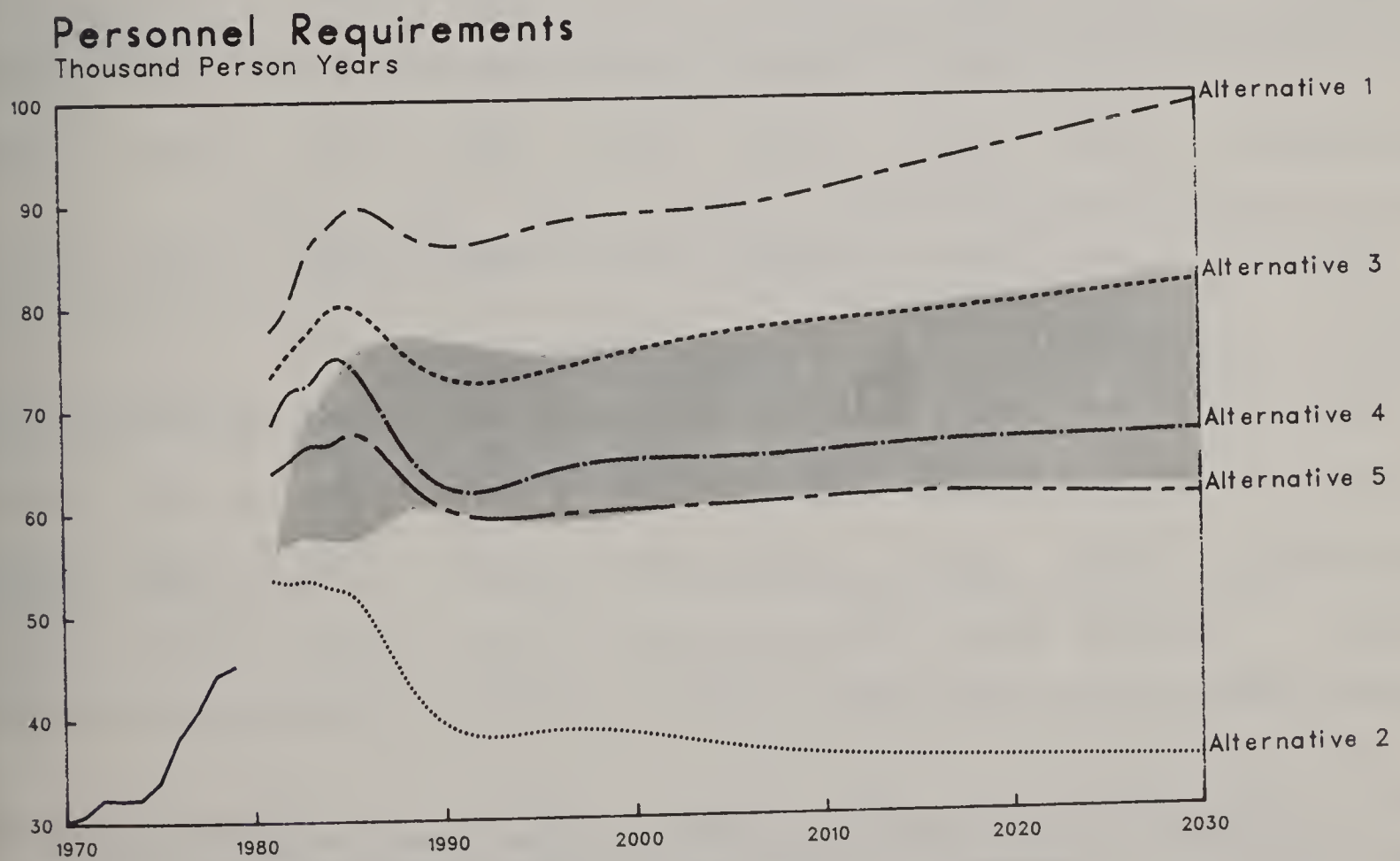


Figure 4.45



ENVIRONMENTAL EFFECTS

This section compares environmental effects of the Program with effects of the Alternatives. Items compared include the estimated economic, physical, biological, and social effects in reference to present conditions. Emphasis here is on national effects, but regional data are sometimes displayed for clarity.

Economic Effects

Discounted benefits, costs, and present net worth at 7-1/8 percent were used to compare the economic effects of the Program and the Alternatives for the National Forest System. In addition, comparisons were made using alternative discount rates and returns to government.

Present Net Worth

The High Bound of the Program has a higher present net worth than any single Alternative Program Direction considered (table 4.4). ^{15/} The closest to the Program in terms of present net worth was Alternative 4a. The Low Bound of the Program has a present net worth somewhat lower than Alternative 4a, but higher than the other Alternatives.

Table 4.4.--Present net worths of NFS Programs and Alternatives
discounted at 7-1/8 percent, by resource element

(Million Dollars)

Resource Element	Recommended Program		Alternatives					
	Low	High	1	2	3	4	4a	5
Recreation	7,759	8,021	7,857	7,550	7,628	9,018	9,018	7,966
Wilderness	1,596	2,055	1,846	1,181	1,599	2,397	2,397	1,554
Wildlife & Fish	3,263	3,662	3,488	3,431	3,546	3,396	3,396	3,243
Range	133	75	-176	242	-1	136	114	114
Timber	17,564	18,169	16,082	16,570	16,313	15,767	17,505	17,415
Water	11,868	11,546	11,271	12,440	11,425	11,736	11,708	11,913
Minerals	4,676	5,389	5,386	3,480	4,408	3,750	4,408	4,250
TOTAL	46,859	48,917	45,754	44,894	44,918	46,200	48,546	46,455

^{15/} Support element costs have been allocated among resource elements for this analysis. See appendix C for details on the procedures used.

In the following presentations, NFS present net worths contributed by each resource element in the Program and the Alternatives are discussed on a resource element basis. The reader should also look at present value cost as an indicator of program level and its relationship to the present value benefits.

Recreation.--For recreation, the present net worths for all Alternatives are relatively close. Only Alternatives 4 and 4a have a higher present net worth than the High Bound of the Program.

Present value costs, benefits, and present net worths
for recreation at a 7-1/8 percent discount rate

Criterion	Recommended Program		Alternatives				
	Low	High	1	2	3	4 & 4a	5
(Millions of Dollars)							
Present value cost	3,851	6,686	8,359	3,544	7,155	6,968	5,898
Present value benefit	11,610	14,707	16,216	11,094	14,783	15,986	13,864
Present net worth	7,759	8,021	7,857	7,550	7,628	9,018	7,966

Wilderness.--As for recreation, the present net worth of the Program is slightly less than Alternatives 4 and 4a and higher than the other Alternatives.

Present value costs, benefits, and present net worths
for wilderness at 7-1/8 percent discount rate

Criterion	Recommended Program		Alternatives				
	Low	High	1	2	3	4 & 4a	5
(Millions of Dollars)							
Present value cost	566	857	1,130	488	893	1,163	799
Present value benefit	2,162	2,912	2,976	1,669	2,492	3,560	2,353
Present net worth	1,596	2,055	1,846	1,181	1,599	2,397	1,554

Wildlife and Fish.--The High Bound of the Program has the highest present net worth indicating that it is the most desirable in terms of economic returns for wildlife and fish. However the Low Bound ranks below all Alternatives except 5.

Present value costs, benefits, and net present worths for
wildlife and fish at a 7-1/8 percent discount rate

Criterion	Recommended Program		Alternatives				
	Low	High	1	2	3	4 & 4a	5
(Millions of Dollars)							
Present value cost	598	1,814	2,180	568	1,715	1,943	1,221
Present value benefit	3,861	5,476	5,668	3,999	5,261	5,339	4,464
Present net worth	3,263	3,662	3,488	3,431	3,546	3,396	3,243

Range.--The lower present net worth of the Program at the Low Bound as compared to alternatives 2 and 4 and at the High Bound as compared to alternative 5 is primarily due to costs of range improvement in the Southwest where livestock grazing use on National Forest System lands is especially important for community stability. It should be emphasized, however, that the overall Program for range has positive returns at a 7-1/8 percent discount rate.

Present value costs, benefits, and net worths
for range at a 7-1/8 percent discount rate

Criterion	Recommended Program		Alternatives				
	Low	High	1	2	3	4	4a & 5
(Millions of Dollars)							
Present value cost	710	921	1,397	623	1,125	808	918
Present value benefit	843	996	1,221	865	1,124	944	1,032
Present net worth	133	75	-176	242	-1	136	114

Timber.--The present net worth of the Program is larger than that of any of the Alternatives.

Present value costs, benefits, and present net worths
for timber at a 7-1/8 percent discount rate

Criterion	Recommended Program		Alternatives					
	Low	High	1	2	3	4	4a	5
(Millions of Dollars)								
Present value cost	16,911	18,607	20,933	11,312	19,153	13,214	16,562	17,069
Present value benefit	34,475	36,776	37,015	27,882	35,466	28,981	34,067	34,484
Present net worth	17,564	18,169	16,082	16,570	16,313	15,767	17,505	17,415

Water.--The High Bound of the Program has a high present value cost exceeded only by that of Alternative 1. Lower cost Alternatives 2, 4, 4a, and 5 each have a higher present net worth than either Program Bound.

Although the increased investments above Alternative 2 do not earn the discount rate, they are required to maintain water quality.

Present value costs, benefits, and present net worths
for water at a 7-1/8 percent discount rate

Criterion	Recommended Program		Alternatives					
	Low	High	1	2	3	4	4a	5
(Millions of Dollars)								
Present value cost	2,389	1,781	2,736	1,371	2,380	2,174	2,272	1,999
Present value benefit	13,935	13,467	14,007	13,811	13,805	13,910	13,980	13,912
Present net worth	11,868	11,546	11,271	12,440	11,425	11,736	11,708	11,913

Minerals.--The Program represents an attractive investment. All Alternatives except 1 have lower present net worths; Alternative 1 falls between the Low and High Bounds.

Present value costs, benefits, and present net worths
for minerals at a 7-1/8 percent discount rate

Criterion	Recommended Program		Alternatives				
	Low	High	1	2	3 & 4a	4	5
(Millions of Dollars)							
Present value cost	651	974	999	551	837	658	762
Present value benefit	5,327	6,363	6,385	4,031	5,245	4,408	5,012
Present net worth	4,676	5,389	5,386	3,480	4,408	3,750	4,250

Sensitivity Review of Discount Rates and Other Assumptions

The determination of an appropriate discount rate for assessing productivity of public investments is theoretically and empirically complex. There is no consensus among economists on what rate should be used for evaluating long-term investments. To provide consistency, the Office of Management and Budget has, since 1969, required discount rates of 10 percent for most Federal projects and a lower exception rate, now at 7-1/8 percent, ^{16/} for water and related projects. The conceptual basis for these rates and its relevance to current economic conditions has been recently reviewed. Statistical evidence and analysis have shown that in constant dollars a rate of 4 percent might best represent the opportunity cost of capital for Federal investment in our society. ^{17/} Therefore, in the sensitivity review, discount rates of 4 percent, 7-1/8 percent, and 10 percent were used.

Analysis showed that the ranking of Alternatives for the National Forest System was not sensitive to the different discount rates at the national level. Although the use of higher discount rates diminished the present net worth, the present net worth for each Alternative remained positive even at the 10 percent rate. The ranking of Alternatives, based on the maximum present net worth estimates is very insensitive to the range of discount rates considered (table 4.5). In no element does the difference in discount rates alter the ranking of the Alternatives having the highest present net worth at 7-1/8 percent.

^{16/} This rate, adjusted periodically, is based on average yield of long-term government bonds.

^{17/} U.S. Department of Agriculture. Discount ratios to be used by the Forest Service for long-term investments. Forest Service, June 1979, 11 pp.

Table 4.5--Present net worth for NFS Program and Alternatives discounted
at 4, 7-1/8, and 10 percent by resource element
(Million Dollars)

Element	% Discount Rate	Recommended Program		Alternatives					
		Low	High	1	2	3	4	4a	5
Recreation	4	13,308	13,763	13,764	12,291	13,426	*15,598	*15,598	13,558
	7-1/8	7,759	8,021	7,857	7,550	7,628	*9,018	*9,018	7,966
	10	5,413	5,598	5,337	5,413	5,168	*6,181	*6,181	5,533
Wilderness	4	2,885	3,713	3,411	2,011	2,919	*4,423	*4,423	2,818
	7-1/8	1,596	2,055	1,846	1,181	1,599	*2,397	*2,397	1,554
	10	1,059	1,363	1,204	825	1,054	*1,566	*1,566	1,034
Wildlife & Fish	4	5,459	*6,127	5,844	5,504	5,928	5,653	5,653	5,359
	7-1/8	3,263	*3,662	3,488	3,431	3,546	3,396	3,396	3,243
	10	2,305	*2,587	2,461	2,481	2,512	2,411	2,411	2,316
Range	4	299	169	-262	*368	27	220	197	197
	7-1/8	133	75	-176	*242	-1	136	114	114
	10	117	66	-136	*182	-9	101	78	78
Timber	4	34,347	*35,519	32,643	31,227	32,353	30,163	34,560	33,621
	7-1/8	17,564	*18,169	16,082	16,570	16,313	15,767	17,505	17,415
	10	11,540	*11,934	10,408	11,251	10,732	10,735	11,524	11,673
Water	4	18,233	17,702	17,308	*19,181	17,524	18,004	17,963	18,271
	7-1/8	11,868	11,546	11,271	*12,440	11,425	11,736	11,708	11,913
	10	8,897	8,638	8,428	*9,266	8,546	8,776	8,750	8,912
Minerals	4	10,677	12,711	*12,718	8,213	10,403	8,850	10,403	10,030
	7-1/8	4,676	*5,389	5,386	3,480	4,408	3,750	4,408	4,250
	10	2,623	3,123	*3,126	2,018	2,557	2,175	2,557	2,465
Total	4	85,208	*89,704	85,426	78,795	82,583	82,911	88,797	83,854
	7-1/8	46,859	*48,917	45,754	44,894	44,918	46,200	48,546	46,455
	10	31,954	*33,309	30,828	31,436	30,560	31,995	33,067	32,011

* Maximum present net worth

A Program of this kind must also be based on a series of assumptions on the basic determinants of demand and supply, such as growth in population, economic activity, and income. In making assumptions about these other basic determinants, it was recognized that the long-run course of events may be quite different from what was assumed. However, the variation that can be reasonably expected is not likely to have major impacts on Alternative comparisons. For example, if the rate of increase in the gross national product from 1977 to 1990 continued at the average rate during the last 5 years of 2.8 percent instead of the assumed rate of 3.7 percent, the demand for outdoor recreation in 1990 would only be reduced 1 percent below the projected level. There would be larger reductions in the demand for most timber products, about 5 percent for lumber and plywood. But the reductions would not be large enough to significantly change the basic timber demand-supply outlook or the projected increases in timber prices.

Returns to Government

Monetary returns to government include cash payments, required deposits from timber purchasers to finance activities resulting from timber sales (such as Knutson-Vandenberg deposits), and credits allowed for work performed by the purchasers. Alternative 1 shows greater returns than other Alternatives over the entire period. However, returns from the High Bound of the Program are only slightly lower. Returns from the Low Bound exceed Alternatives 2 and 4 and are approximately equal to Alternative 5. The annual amounts returned to government including both dollars and credits for each Alternative are as follows:

Year	Recommended Program		Alternative					
	Low	High	1	2	3	4	4a	5
(Million Dollars)								
1981	1,692	1,692	1,728	1,482	1,700	1,587	1,680	1,676
1985	2,034	2,317	2,326	1,852	2,277	1,928	2,179	2,132
1995	2,890	3,060	3,102	2,335	2,939	2,465	2,956	2,894
2025	5,444	6,923	7,014	4,125	5,955	4,421	5,969	5,446

Physical-Biological Effects

Physical and biological effects include water and air quality, visual resources, wildlife and fish, vegetation, and cultural resources.

Water Quality

At the High Bound the water program would be commensurate with activities in other resource elements and it would meet water quality goals by 2000.

Water yields increase in Regions 2, 3, and 5. The Low Bound would continue current levels of inventory, monitoring, improvement, and would meet water quality goals by the year 2005. Water yield will be maintained at present levels.

Under Alternative 1, water yield would be maximum, but the amount of water quality would fluctuate. However, changes in water quality would be localized and brief, as the result of intensive protection measures associated with maximum market and nonmarket outputs. Since Alternative 2 specifies relatively low market outputs concentrated on the lowest hazard lands, it would require relatively small efforts to mitigate effects of activities on water quality. The amount of water meeting quality goals would be stable and water yield would be at natural levels. Effects of Alternative 3 would be about the same as those of the Program. Under Alternative 4 and 4a water yield would not change appreciably, and there would be a decrease in management activities that require protection measures.

Further comparisons of effects on water quality are provided in tables 4.6 and 4.7. A discussion of multiple resource interaction effects relevant to water quality can be found in the Assessment.

Table 4.6--Mean annual volume meeting water quality goals 1/,
estimates for 1995

(Million acre feet)

Region	Present	Recommended Program		Alternatives					
		Low	High	1	2	3	4	5	4a
1	35.92	39.05	39.05	39.05	39.05	39.05	39.05	39.05	39.05
2	15.70	18.00	18.00	18.79	18.77	18.77	18.00	18.00	18.00
3	2.15	2.35	2.65	2.65	2.89	2.65	2.33	2.35	2.33
4	26.00	27.17	27.21	27.21	27.17	27.21	27.17	27.17	27.17
5	36.74	37.35	37.59	37.63	37.55	37.59	37.39	37.35	37.39
6	65.00	70.80	71.50	71.50	70.90	71.50	73.00	70.80	70.80
8	19.57	19.75	19.74	19.73	19.71	19.74	19.75	19.75	19.73
9	11.50	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10
10	188.52	189.00	189.00	189.00	189.00	189.00	189.00	189.00	189.00
Total	402.35	415.57	416.84	417.86	415.91	417.61	417.79	415.57	415.57

1/ As defined by 40 CFP-35.1512-4(C).

National Forest System (NFS) and State and private (S&P) lands

1/ Temporary sources of pollution are from freshly treated land that is more subject to erosion when extreme climatic events occur. Due to the localized nature of extreme climatic events, temporary changes will be localized.

Air Quality

At both Bounds of the Program and all Alternatives, all National Forest lands will meet or exceed national ambient air quality standards by 1995. ^{18/} Table 4.8 shows the area of National Forest land which would meet existing national ambient air quality standards in 1995 for each of three categories:

- area meeting existing national ambient air quality standards
- area significantly exceeding existing national ambient air quality standards
- area below existing national ambient air quality standards

By 1995, the area meeting existing national ambient air quality standards will increase by 15.6 million acres. Changes for the Program compared to those for the Alternatives are as follows:

Change in National Forest System land area meeting, and significantly exceeding, existing national ambient air quality standards by 1995

(Thousand acres)

Criterion	Recom- mended Program	Alternatives				
		1	2	3	4 and 4a	5
Increase in area meeting NAAQS standards ^{17/}	15,587	15,587	15,587	15,587	15,587	15,587
Decrease in area significantly exceeding standards	692	15,879	692	9,442	6,139	692

Table 4.9 compares the effects of the Program with those of the Alternatives. Further discussion of multiple resource interaction effects relevant to air quality can be found in the Assessment.

^{18/} Based on Clean Air Act requirements that attainment be achieved in all nonattainment areas by 1982 and 1987. Actual increases depend upon State strategies for achieving attainment.

Table 4.8.--National Forest System land having air quality meeting, significantly exceeding and below national ambient air quality standards: Estimates for 1995

(Thousand acres)

Region	Present 5/1/78	Recommended Program	Alternatives				Remarks
			1	2	3	4 and 4a	
1	Meeting Significantly exceeding Below	2,361 22,478 385	2,361 22,478 0	2,746 22,478 0	2,746 22,478 0	2,746 22,478 0	Recommended Program and all Alternatives result in similar effects.
2	Meeting Significantly exceeding Below	0 16,609 4,500	13,250 7,859 0	4,500 16,609 0	13,250 7,859 0	4,500 16,609 0	Recommended Program and Alternatives 2, 4, and 5 result in little change. Alternatives 1 and 3 would result in a decrease of the area significantly exceeding results.
3	Meeting Significantly exceeding Below	11,900 8,516 100	17,590 2,926 0	16,600 3,916 0	16,600 3,916 0	16,600 3,916 0	Recommended Program and all Alternatives will result in a decrease of areas below and significantly exceeding standards.
4	Meeting Significantly exceeding Below	27,793 2,794 550	28,343 2,794 0	28,343 2,794 0	28,343 2,794 0	28,343 2,794 0	Recommended Program and all Alternatives will not significantly affect air quality.
5	Meeting Significantly exceeding Below	4,496 6,920 8,849	14,884 5,381 0	9,437 10,828 0	9,437 10,828 0	14,884 5,381 0	Recommended Program and Alternatives 2, 3, & 5 will result in an increase in the "significantly exceeds national ambient standards" category.
6	Meeting Significantly exceeding Below	24,655 0 0	24,655 0 0	24,655 0 0	24,655 0 0	24,655 0 0	Possible increase in emissions in short term for the Recommended Program. No change over long term. All air standards will be met.
8	Meeting Significantly exceeding Below	1,281 10,000 1,200	2,481 10,000 0	2,481 10,000 0	2,481 10,000 0	2,481 10,000 0	Possible increase in emissions in short term for the Recommended Program. No change over long term. All air standards will be met.
9	Meeting Significantly exceeding Below	670 10,844 0	670 10,844 0	670 10,844 0	670 10,844 0	670 10,844 0	The mean quality of air over NFS lands is significantly better than national ambient standards. No change is anticipated as a result of Forest Service activities.
10	Meeting Significantly exceeding Below	2 19,994 3	5 19,994 0	5 19,994 0	5 19,994 0	5 19,994 0	Air quality over NFS lands significantly exceeds State standards. Only minor changes would be expected among Alternative programs.
Total Meeting		73,158	89,437	104,624	89,437	98,187	89,437
Significantly exceeding		98,155	97,463	82,276	97,463	88,713	97,463
Below		15,587	0	0	0	0	0
		186,900	186,900	186,900	186,900	186,900	186,900

National Forest System (NFS) and State and private (S&P) lands

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Visual Resources

Visual Quality is measured as net acres in each of five categories:

- Preservation, allows ecological changes
- Retention, allows management activities which are not visually evident
- Partial retention, allows management activities which are visually subordinate to the characteristic landscape but which borrow from the natural form, color, line, etc.
- Modification, allows management activities which may dominate the landscape but exhibit natural occurrence characteristics of the surrounding area
- Maximum modification, allows management activities which may dominate the landscape but exhibit natural occurrence characteristics when viewed as background.

Estimates of National Forest System net acres in each visual quality category for the Program and Alternatives are shown in table 4.10.

At the High Bound, the Program emphasizes nonmarket outputs and gives high priority to visual quality. However, there would be short-term impacts on color and texture from high levels of vegetative management activities. The impacts would subside as long-term regrowth takes place. Wildlife habitat improvements would add pleasing visual variety in the long term. At the Low Bound, achievement of retention objectives for visual quality would exceed the High Bound, but preservation and modification objectives would be met at a slightly lower level.

Under Alternative 1, color and textural changes would be severe in the short term. Over the long term, man-caused visual impacts would revert to a natural appearance.

Under Alternative 2, short-term impacts would be slight. The long-term effect would be a decrease in visual variety and in opportunities for enhancement. Reduced activity would tend to retain the present degree of naturalness and there would be little rehabilitation for old visual scars.

Table 4.11 draws additional comparisons between the Program and Alternatives. Further discussion of multiple resource interaction effects relevant to visual quality can be found in the Assessment.

Table 4.10.--Areas under five visual quality objectives: estimates for 1995
(Thousand Net Acres of National Forest System Lands)

Region	Visual Quality Objectives	Present 5/1/78	Recommended Program		Alternatives					Remarks
			Low Bound	High Bound	1	2	3	4	5	
1	Preservation	4,283	6,297	6,700	6,100	4,900	5,000	7,000	6,400	The largest increases in preservation will occur under Alternative 4 as a result of potential wilderness designation.
	Retention	5,738	5,003	4,500	5,932	5,829	5,764	5,920	5,742	
	Partial Retention	7,858	6,200	6,000	6,847	7,492	7,388	6,395	6,653	
	Modification	6,809	7,200	7,500	5,850	6,519	6,592	5,455	5,947	
	Max. Modification	572	560	560	531	520	516	490	518	
2	Preservation	2,400	3,479	3,700	4,580	3,100	3,700	5,370	4,280	All Alternatives show a substantial increase in the preservation category due to expected wilderness designations.
	Retention	5,354	3,500	3,314	5,382	5,401	5,196	5,380	5,384	
	Partial Retention	7,331	6,750	6,605	6,212	6,942	6,660	5,812	6,238	
	Modification	6,347	5,765	5,870	5,308	6,040	5,943	4,956	5,576	
	Max. Modification	532	470	475	482	481	465	466	486	
3	Preservation	5,400	3,300	3,500	3,600	5,400	4,500	5,400	5,400	
	Retention	3,000	3,950	3,800	3,090	3,000	3,045	3,000	3,000	
	Partial Retention	4,400	5,700	5,500	5,930	4,400	5,165	4,400	4,400	
	Modification	5,900	5,750	5,900	5,990	5,900	5,945	5,900	5,900	
	Max. Modification	1,900	1,900	1,900	1,990	1,900	1,945	1,900	1,900	
4	Preservation	3,115	5,015	5,875	7,500	3,115	5,000	9,000	6,000	Alt. 2, 4, and 5 result in the greatest adjustments. Alt. 1 results in the greatest increase to the modification and maximum modification categories.
	Retention	13,392	11,680	11,125	6,690	13,392	10,295	11,430	12,430	
	Partial Retention	9,032	7,350	7,045	3,575	9,032	7,180	7,070	8,070	
	Modification	4,983	5,850	5,800	8,559	4,983	4,512	3,022	4,022	
	Max. Modification	623	1,250	1,300	4,821	623	4,158	623	623	
5	Preservation	5,850	4,900	5,100	3,500	2,150	2,400	8,400	3,000	A maximum decrease of one level of visual quality is estimated for Alt. 1, 2, and 3. No unacceptable modification will occur under any Alternative.
	Retention	3,500	2,150	2,000	1,750	3,100	2,350	2,550	2,350	
	Partial Retention	4,700	5,200	5,000	5,850	7,400	6,650	5,150	6,200	
	Modification	3,500	2,850	3,000	5,450	4,500	5,250	2,500	5,200	
	Max. Modification	1,950	2,400	2,400	2,950	2,350	2,850	900	2,750	
6	Preservation	3,580	3,680	3,701	4,244	4,070	3,911	4,770	3,700	
	Retention	2,890	2,834	2,811	2,049	3,826	2,174	5,116	2,834	
	Partial Retention	6,765	6,568	6,482	4,893	7,465	5,476	6,227	6,568	
	Modification	7,211	7,070	7,161	7,860	5,641	7,759	5,307	7,070	
	Max. Modification	3,995	4,289	4,286	5,395	3,433	5,121	3,021	4,268	
8	Preservation	150	423	480	1,125	150	540	1,125	540	It is estimated that the least change will result with Alt. 2. Effects under Alt. 3 and 5 also will result in similar effects.
	Retention	983	4,200	4,013	974	797	886	1,063	886	
	Partial Retention	3,539	1,150	976	3,785	3,097	3,441	4,129	3,441	
	Modification	3,476	2,742	3,046	2,818	3,738	3,379	2,602	3,326	
	Max. Modification	4,368	4,042	4,042	3,814	4,734	4,270	3,597	4,323	
9	Preservation	970	1,074	1,096	1,484	970	1,141	1,997	1,141	No change from present conditions is estimated for Alt. 2. Alt. 1 and 5 will result in the maximum area in the modification and maximum modification categories.
	Retention	1,484	1,900	1,849	1,027	1,484	1,826	2,054	1,141	
	Partial Retention	2,967	3,400	3,354	2,054	2,967	3,310	3,367	2,282	
	Modification	3,709	2,938	3,013	4,222	3,709	3,081	2,282	3,995	
	Max. Modification	2,282	2,100	2,100	2,625	2,282	2,054	1,712	2,853	
10	Preservation	2,500	6,929	7,836	5,300	1,500	3,400	6,400	3,000	Strong fluctuations between Alternatives reflect the potential for establishment of large acreages of wilderness with high market outputs on the remainder.
	Retention	800	2,900	2,800	400	3,000	800	4,300	800	
	Partial Retention	4,211	3,275	3,075	911	9,211	6,611	4,600	3,111	
	Modification	6,500	2,700	3,000	7,600	3,900	4,500	2,345	6,800	
	Max. Modification	6,000	3,444	3,444	5,900	2,500	4,800	2,465	6,300	

Table 4.11.--Visual quality effects for 1985 and 1995

(National Forest System)

Recommended Program

Low Bound

High Bound

Low Bound Program - Reduced timber harvest and mineral activity will increase VQO acreages of Retention and Partial Retention from those under the High Bound Program. This is generally true in all Regions but more specifically because of minerals activity and related road systems in Regions 1 and 2 and because of timber harvesting in Regions 1, 5, and 6.

The decrease in the Preservation VQO acreage over the High Bound Program is basically because of fewer acres of Wilderness.

The High Bound of the Program would provide a continuation of most activities which impact the visual resource. Some short term impacts would increase in the Pacific Northwest due to increases in commodity outputs activities, but this would have less than 1% overall effect on the established visual quality objectives (VQO). Expected increases in minerals activities would result in potential visual quality impacts but the High Bound of the Program would provide for mitigation and would also initiate actions where opportunities exist to correct negative impacts of past mineral activities. Long and short term effects will be minimal and visual quality will show improvement. There will be significant increases in the Preservation VQO. Commodity programs effects will be most visible after 1985 but mitigation practices will be also, improved by that time.

ALTERNATIVE PROGRAM DIRECTION

1

This Alternative, with highest level of activity, gives greatest potential for visual impact, and provides greatest resources for moderating that impact. Net effect on the visual quality objective (VQO) acreage (other than Preservation): 50% would retain their recommended VQO, 50% would drop one level. Increased wildernesses would cause no short-term change in present visual quality. Over the long term, any man-caused visual impacts would revert to a natural appearance, significantly increasing the acreage and meeting a Preservation VQO. Color and textural changes caused by resource harvest, transportation systems, etc. would be severe in the short-term, especially in the SW, and Rocky Mountains. These would moderate considerably as long-term regrowth takes place. Those activities which lead to significant rock and earth removal produce most irreversible irretrievable visual resource commitments. Such commitments would be most prevalent in this Alternative.

2

Reduced quality will tend to retain present degree of naturalness in National Forest landscapes. Also will provide little opportunities to rehabilitate old visual scars; or negative impacts; 80% of recommended VQO's will hold, 20% will decrease one level, partly as a result of focusing activities on better more confined sites. Short-term impacts on visual resource will be slight--maintenance of status quo. Long-term lack of market output activity would lead to decrease of visual variety and opportunities for opening scenic views, etc. Minimum activity will cause least amount of earth, rock-and-water disturbance. Thus, this Alternative would produce the least amount of irreversible and irretrievable visual effects.

3

Moderate increase of market outputs activities will require one VQO level reduction (because of trade-off) on 35% of non-Preservation VQO acreage. Acreage in Preservation VQO will increase moderately. Short-term impacts on color and texture of forest landscapes will be significant. These impacts will subside as long-term regrowth takes place. Wildlife habitat improvements will add some pleasing visual variety over the short and long-term. There will be moderate irreversible and irretrievable effects from earth and rock-disturbing activities.

4

Emphasis on nonmarket outputs gives high priority to visual quality. Most recommended VQO's will be met; 50% of Modification and Maximum Modification VQO acreage will rise to Partial Retention and Modification, respectively. High acreage in Preservation VQO. Short-term visual impacts will be slight. Short and long-term wildlife habitat improvements will add pleasing visual variety. Preservation VQO acreage will increase over the long-term with the substantial increase in number of wildernesses. There will be minimum irreversible and irretrievable visual effects.

5

Continuation of present program outputs will lower 40% of the recommended VQO acreages one quality level. There will be support for moderation of the visual impact of the more severe visual impacting activities. A slight increase of acreage in Preservation VQO. Moderate short-term impacts on color and texture of forest landscapes. These will improve as long-term revegetation occurs. There will be moderate irreversible and irretrievable visual effects from earth, rock, and water-disturbing activities.

Wildlife and Fish

The effects on wildlife and fish are given as population trend estimates--up, down, and no change--for 1995. For comparison, the present or current population trend is also given.

Tables 4.12 through 4.14 show the effect of the Program and the Alternatives on population trends for selected species. They include endangered and threatened species, species with special habitats, and species commonly hunted, fished, and trapped.

Alternative 4 would provide the maximum effort to protect, maintain, and enhance endangered or threatened species habitat and provide habitat diversity to maintain all vertebrates and selected invertebrates. It would realize 100 percent of the potential of anadromous and resident fish habitat, and it would improve habitat of important species to permit high population.

Alternative 2 would generally protect and conserve endangered and threatened species habitats except those of several species of plants, which would decline. Habitat diversity would be well distributed on each National Forest, fish habitat capability would be at 60 percent of potential, and important species habitat would provide low population levels.

Table 4.15 summarizes the effects on wildlife and fish habitat for the Program and Alternatives. Further discussion of multiple resource interaction effects relevant to wildlife and fish can be found in the Assessment.

Estimates of declining population trends at the Low Bound of the Program for several species are indicative of only slight actual population differences from Alternative 2. They are estimated, in the short term, to occur as a result of program mix changes at the Low Bound which reduced wildlife and fish program element activities relative to other program elements. While onsite mitigation of adverse effects is provided for under any program mix, offsite mitigation under some program mix circumstances could not be accomplished. For example, intensive forest management practices such as accelerated reforestation would shorten early successional vegetative stages favorable to deer. This effect would normally be offset by habitat improvement work at another location (offsite) from that being affected directly by an activity. This was fully accounted for in estimating effects for the specific combination of activity levels in Alternative 2. The estimated slight decline in population trends at the Low Bound for the indicated species is primarily a result of the change in program and activity mix which would not fully provide for offsite mitigation.

Vegetation

For purposes of comparison, effects on vegetation have been grouped into three categories:

- Type conversion (table 4.16)
- Species and community diversity (table 4.17)
- Successional stages (table 4.18)

In addition, wood, herbage, and browse production were estimated in qualitative terms (table 4.19). A summary of effects on vegetation is included in table 4.20. In tables 4.15 through 4.19, effects of the High Bound

Table 4.12.--Endangered and threatened animals and plants:
population trend estimates for 1995 1/

(National Forest System)

Species	Region	Present trend	Recommended Program		Alternatives						4a
			Low	High	1	2	3	4	5		
Grizzly bear	1	==	==	==	++	==	++	++	==	==	
	2	==	==	==	==	++	++	++	==	++	
	4	==	==	++	++	==	==	++	==	==	
	6	==	==	==	==	==	==	++	==	++	
Black-footed ferret	1	==	==	==	==	==	==	==	==	==	
Gray wolf	1	==	==	==	++	==	++	++	==	==	
	9	--	==	++	++	--	++	--	==	--	
Bald eagle	1	==	==	++	++	==	++	++	==	==	
	3	--	==	++	++	==	++	++	==	++	
	4	==	==	++	++	==	==	++	==	==	
	5	==	==	++	++	==	++	++	==	++	
	6	==	==	++	==	++	++	++	==	++	
	9	++	==	++	==	==	++	==	==	==	
Peregrine falcon	1	==	==	++	++	==	++	++	==	==	
	2	++	==	++	==	++	++	++	==	++	
	3	--	==	++	++	==	++	++	==	++	
	5	++	==	++	++	==	++	++	++	++	
	6	++	==	++	++	==	++	++	==	++	
Red-cockaded woodpecker	8	++	==	++	++	==	++	==	++	==	
Spotfin chub	8	==	==	++	++	==	++	==	++	++	
Apache trout	3	==	==	++	++	==	++	++	==	++	
Gila trout	3	==	==	++	++	==	++	++	==	++	
Greenback cutthroat trout	2	++	==	++	++	==	++	++	==	++	
Lahontan trout	4	==	==	++	++	==	==	++	==	++	
	5	==	==	++	==	==	++	++	==	++	
Arizona hedgehog cactus (Echinocereus triglochidiatus var. arizonicus)	3	==	==	++	++	==	==	++	==	++	
Spineless hedgehog cactus (Echinocereus triglochidiatus var. inermis)	4	==	==	==	==	==	==	==	==	==	
Kuenzler hedgehog cactus (Echinocereus kuenzleri)	3	--	==	++	++	--	==	++	==	++	
Nichol's Turk's head cactus (Echinocactus horizontalis var. nicholii)	3	--	==	==	==	==	--	==	==	==	
Peebles Navajo cactus (Pediocactus peeblesianus var. peeblesianus)	3	==	==	==	==	==	==	==	==	==	
Sneed pincushion cactus (Coryphantha sneedii var. sneedii)	3	==	==	==	==	==	==	==	==	==	
MacFarlane's four-o'clock (Mirabilis macfarlanei)	4	--	--	++	++	--	++	++	--	++	
	6	==	--	++	++	--	++	++	==	++	
Virginia round-leaf birch (Betula uber)	8	==	==	==	==	==	==	==	==	==	
Rydberg milk-vetch (Astragalus perianus)	4	==	==	==	++	==	==	++	==	++	
Truckee barberry (Berberis sonnei)	5	==	==	++	++	==	++	++	==	++	
McDonald's rock-cress (Arabis mcdonaldiana)	5	==	--	++	++	==	++	++	--	++	
	6	--	--	++	++	==	++	++	--	++	
Phacelia argillacea	4	--	--	++	++	--	==	++	==	++	

1/ ++, increasing; ==, no change; --, declining.

Table 4.13.--Species with special habitats:
population trend estimates for 1995 1/

National Forest System

Species	Region	Present trend	Recommended Program		Alternatives					
					1	2	3	4	5	4a
			Low	High						
Fisher	1	==	--	==	--	++	--	++	==	++
Otter	1	==	--	==	--	++	==	++	==	==
Black hawk	3	--	--	++	++	--	==	++	==	++
Coopers hawk	4	--	--	==	++	--	==	++	--	==
Goshawk	3	--	--	++	--	==	--	++	==	++
	4	--	--	++	--	==	--	++	==	++
Great blue heron	9	==	--	++	==	--	++	==	==	==
Ruby crowned kinglet	10	--	--	--	--	--	--	--	--	--
Osprey	8	++	==	++	++	==	++	++	==	++
Barred owl	8	==	==	++	++	==	++	++	==	++
Spotted owl	3	--	--	--	--	--	--	==	--	==
	5	--	--	--	--	--	--	==	--	==
	6	--	--	--	--	--	--	==	--	==
Brewers sparrow	4	++	--	==	++	--	==	++	--	==
Yellow bellied sapsucker	4	==	==	==	++	--	==	++	==	==
	10	--	--	--	--	--	--	--	--	--
Downy woodpecker	2	--	==	==	--	++	==	++	==	==
Hairy woodpecker	1	--	--	--	--	++	--	++	--	==
	4	==	==	==	++	--	==	++	==	==
Pileated woodpecker	1	--	--	--	--	==	--	++	--	==
	6	--	--	==	--	==	==	++	--	++
	9	--	==	++	--	++	++	==	==	==
Redheaded woodpecker	8	==	==	++	++	==	++	++	==	++
House wren	2	==	==	==	--	++	++	++	==	==

1/ ++, increasing; ==, no change; --, declining.

Table 4.14.--Species commonly hunted, fished, or trapped:
population trend estimates for 1995 1/

(National Forest System)

Species	Region	Present trend	Recommended Program		Alternatives					
			Low	High	1	2	3	4	5	4a
Beaver	9	--	==	++	--	--	++	++	==	++
Mule deer	2	++	--	++	++	--	++	++	==	++
	4	++	--	==	++	--	++	++	==	==
	5	++	--	++	++	--	++	++	==	++
Sitka black-tailed deer	10	--	--	--	--	--	--	==	--	==
White-tailed deer	1	==	--	==	--	--	--	--	==	==
	8	++	--	++	++	--	++	++	==	--
	9	--	--	==	++	--	==	++	==	++
Elk (Rocky Mountain)	1	++	--	==	--	--	==	++	==	==
	2	++	--	++	==	--	==	++	--	==
	3	++	--	++	++	--	==	++	==	++
	4	++	--	++	++	--	==	++	--	==
	6	++	--	++	==	--	++	++	==	==
Elk (Roosevelt)	6	++	--	++	++	--	++	++	==	++
Marten	2	--	--	==	--	==	--	==	==	==
	5	==	--	==	--	==	--	++	==	++
	10	--	--	--	--	==	--	==	--	==
Mink	10	--	--	==	--	==	--	==	--	==
Abert squirrel	3	--	==	++	--	==	==	++	==	++
Squirrels	8	++	==	++	++	==	++	++	==	++
Sage grouse	4	--	--	==	==	--	==	++	--	++
Wild turkey	9	==	==	++	--	==	++	==	==	==
Largemouth bass	8	==	==	++	++	==	++	++	==	++
Smallmouth bass	9	--	--	++	++	--	++	++	--	++
Brook trout	9	--	--	++	==	--	++	++	--	++
Brown trout	2	==	--	==	==	==	==	++	==	==
	3	--	--	++	==	==	==	++	==	++
	4	==	--	++	++	--	==	++	==	++
Cutthroat trout	1	==	--	++	++	--	==	++	==	==
	2	--	--	==	--	--	==	++	==	==
	4	==	--	++	++	--	==	++	==	++
Rainbow trout	1	==	--	++	++	--	==	++	==	==
	3	--	--	++	==	--	==	++	==	++
	8	==	--	++	++	==	++	++	==	++
Resident trout	6	==	--	++	++	--	++	++	==	++
Steelhead trout	1	--	--	++	==	--	++	++	==	++
	5	--	--	++	==	==	++	++	==	++
	6	--	--	++	==	--	++	++	==	++
Grayling	1	==	--	--	++	==	==	++	==	==
Chinook salmon	1	--	++	++	==	--	++	++	==	++
	4	--	++	++	==	--	==	++	==	++
	6	--	++	++	==	--	++	++	==	++
Coho salmon	6	--	++	++	==	--	++	++	==	++
	10	--	++	++	==	--	++	--	==	++
Pink salmon	10	--	++	++	==	--	++	++	==	++

1/ ++, increasing; ==, no change; --, declining.

Table 4.15.--Wildlife and fish habitat effects for 1995

National Forest System

Recommended Program	Alternatives			
	1	2	3	4 and 4a
-E&T Species habitat (plant and animal): Federally listed and sensitive species regulations protected and maintained at the Low Bound and enhanced at the High Bound.	-E&T Species habitat (plant and animal): Protect and enhance for Federally listed species and for sensitive species.	-E&T Species habitat (plant and animal): Federally listed species protected and enhanced. Maintain viable populations of sensitive species.	-E&T Species habitat (plant and animal): Protect and enhance for Federally listed species and for sensitive species.	-E&T Species habitat (plant and animal): Federally listed species protected and enhanced. Maintain viable populations of sensitive species.
-Habitat diversity well distributed on each NF to maintain viable populations of all vertebrates and selected invertebrates.	-Habitat Diversity provided on each NFS compartment or 10,000 acres to maintain viable populations of all vertebrates and selected invertebrates.	-Habitat Diversity well distributed on each NF provided to maintain viable populations of all vertebrates and selected invertebrates.	-Habitat Diversity well distributed provided on each Ranger District to maintain viable populations of all vertebrates and selected invertebrates.	-Habitat Diversity well distributed on each NF to maintain viable populations of all vertebrates and selected invertebrates.
-Opportunities for appreciative enjoyment of wildlife and fish at 40% of developed recreation and VIS sites at the Low Bound and 80% of the High Bound.	-Opportunities for appreciative enjoyment of wildlife and fish at developed recreation sites and VIS fully realized.	-Opportunities for appreciative enjoyment of wildlife and fish at developed recreation sites and VIS limited to those currently existing.	-Opportunities for appreciative enjoyment of wildlife and fish at the developed recreation sites and VIS.	-Opportunities for appreciative enjoyment of wildlife and fish at 60% of developed recreation sites and VIS.
-Anadromous fish habitat capability at 65% of potential; resident fish habitat capability at 60% of potential at the Low Bound and at 90% and 80% of the High Bound.	-Anadromous and resident fish habitat production capability at 90% of potential.	-Anadromous and resident fish habitat capability at 60% of potential.	-Anadromous and resident fish habitat capability at 80% of potential.	-Anadromous and resident fish habitat capability at 70% of potential.
-Economically and esthetically important species managed to provide low population levels at the Low Bound and moderate population levels at the High Bound.	-Economically and esthetically important species habitat managed to provide high population levels.	-Economically and esthetically important species habitat managed to provide low population levels.	-Economically and esthetically important species habitat managed to provide moderate population levels.	-Economically and esthetically important species habitat managed to provide low to moderate population levels.
-A moderate level of fish and wildlife production and moderate to low use on State and private forest land will result from responding to requests for assistance in habitat management planning.	-A high level of fish and wildlife production with associated moderate use on State and private forest lands will result by providing intensive habitat management planning assistance.	-A low level of fish and wildlife production and low associated use on State and private forest lands will result from limited response to requests for assistance in habitat management planning.	-A moderate level of fish and wildlife production and moderate to low use on State and private forest land will result from responding to requests for assistance in habitat management planning.	-A low level of fish and wildlife production and associated use on State and private forest lands will result from limited response to requests for assistance in habitat management planning.

Table 4.16.--Type conversion effects on vegetation: estimates for 1995

National Forest System (NFS) and State and private (S&P) lands

Recommended Program High Bound	Alternative			Recommended Program Low Bound and 5
	1	2	3 4 and 4a	
<p>NFS</p> <p>-Conversion of shrub to grass types on the most productive sites in Western rangelands; little or no conversion of forest to grasslands in the East.</p> <p>-Introduction of improved forage species on depleted rangelands on productive sites at about same level as in Alt. 3 and 5.</p> <p>-Control of undesired species confined to most productive forest and range land sites; little or no control on less productive sites.</p> <p>-Harvested and catastrophically cleared areas on more productive sites planted to high-yielding trees; little or no planting in Alaska.</p> <p>-Conversion of mixed hardwood-conifer to conifers in the South at about same level as in Alt. 1.</p> <p>S&P</p> <p>-Conversion of native plant communities, introduction of genetically improved species, and control of undesired plants almost as high as in Alt. 1 and higher than Alt. 3.</p>	<p>NFS</p> <p>-Substantial conversion of vegetation types, especially shrubs to grass on Western rangelands and mixed hardwood-conifers in the South.</p> <p>-Largest area planted to improved forage species and high yielding tree species.</p> <p>-Limited conversion of low producing shrub stands to high producing grasslands in Central and North Central States.</p> <p>-Greatest control of undesired species on productive sites.</p> <p>S&P</p> <p>-Substantial conversion to conifers in the South.</p> <p>-Largest area planted to high yielding trees.</p>	<p>NFS</p> <p>-Least conversion of native forest and range land types.</p> <p>-Least introduction of exotic species.</p> <p>-Least control of desired species.</p> <p>S&P</p> <p>-Conversion of native plant communities, introduction of genetically improved species and control of undesired species greatly increased, probably to level higher than Alt. 1.</p>	<p>NFS</p> <p>-Conversion of types, especially shrubs, to grass in Western rangelands but less than in Alt. 1.</p> <p>-Introduction of improved forage grasses and high-yielding trees but less than in Alt. 1.</p> <p>-Maintenance of existing grassland but no conversion of forest to grassland in the East.</p> <p>-Control of undesired species confined mostly to higher productivity sites.</p> <p>S&P</p> <p>-Conversion of native plant communities, introduction of genetically improved species, and control of undesired species should increase but at a level lower than Alt. 1 and 2.</p> <p>-Moderate net increase in area dominated by one or two species.</p>	<p>NFS</p> <p>-Conversion of shrub to grass types in Western rangelands, especially on most productive sites.</p> <p>-Introduction of improved forage species on depleted rangelands and on productive sites, about same level as Alt. 3.</p> <p>-Control of undesired plant species on most productive sites; about same level as Alt. 3.</p> <p>S&P</p> <p>-Little or no change from present levels of type conversions. Introduction of genetically improved species and control of undesired species.</p>

Table 4.17.--Species and community diversity effects on vegetation

National Forest System (NFS) and State and private (S&P) lands

Recommended Program High Bound	Alternatives				Recommended Program Low Bound and 5
	1	2	3	4	
<p>NFS</p> <p>-Diversity maintained primarily through natural factors except in Central Rockies and South where diversity will be maintained through management actions such as wildlife habitat improvement and TSI Activities.</p> <p>-Decrease in diversity on more productive forest and range land sites which are planted to improve species resulting in moderate increase in area dominated by one or two species.</p> <p>-Decrease in diversity counterbalanced by management efforts to provide ecological niches for a broad spectrum of wildlife.</p> <p>-Increase in diversity on unsatisfactory condition rangelands as management improves condition.</p> <p>S&P</p> <p>-Large increases in forested area dominated by one or two species.</p> <p>-Diversity maintained through management actions as S&P efforts to provide technical and other assistance to develop multipurpose forests.</p>	<p>NFS and S&P</p> <p>-Most artificial re-vegetation of cutover, depleted or bare areas leading to areas dominated by one or two species.</p> <p>-Counterbalanced by large-scale efforts to provide ecological niches for broad spectrum of wildlife.</p> <p>-Net increase in diversity and dispersion of vegetation communities.</p>	<p>NFS</p> <p>-Reduction in area of plant communities dominated by one or two species.</p> <p>-Will result largely from natural agents such as fire, disease, and climate.</p> <p>S&P</p> <p>-Increase in area dominated by one or two species.</p> <p>-Net decrease in diversity.</p>	<p>NFS</p> <p>-Net increase in diversity as result of TSI and wildlife activities but less than Alt. 1.</p> <p>-Moderate increase in area dominated by one or two species.</p> <p>-Maintained mostly through management with some resulting from natural catastrophies.</p> <p>S&P</p> <p>-Moderate increase in area dominated by one or two species.</p>	<p>NFS</p> <p>-Diversity will result primarily as a result of natural agents or through wildlife activities.</p> <p>-Decrease in area dominated by one or two species.</p> <p>S&P</p> <p>-Diversity will be maintained through management actions at a level lower than lands in Alt. 1.</p> <p>-Large increase in area dominated by one or two species.</p>	<p>NFS</p> <p>-Moderate increase in area dominated by one or two species, especially on high producing forest lands.</p> <p>-Diversity maintained primarily through natural factors.</p> <p>-Decrease in diversity on most productive sites devoted to production.</p> <p>S&P</p> <p>-Little change from present levels of diversity.</p>

Table 4.18.--Successional stages effects on vegetation: estimates for 1995

National Forest System (NFS) and State and private (S&P) lands

Recommended Program High Bound	Alternatives				Recommended Program Low Bound and 5
	1	2	3	4	
NFS -All stages generally maintained in forested areas except in South and Pacific Northwest where early and middle stages are favored.	NFS -Greatest reduction of old growth stands on commercial forest lands. -Greatest reduction of riparian vegetation.	NFS -Increase in mature and old growth stands in both wilderness and non-wilderness areas. -Late stages favored in both forest and range land areas.	NFS -Old growth stands reduce but less rapidly than in Alt. 1. -Early stages favored on forest lands and late stages favored on rangelands.	NFS -Greatest development of old growth and mature stands. -Late stages favored on forest and range lands.	NFS -Early stages favored. -Old growth reduced.
-Old growth reduced, especially on more productive forest sites, but will increase in time in Alaska and Central Rockies.	-Early stages favored in forested areas and late stages favored on rangelands.	-Extensive areas of early stage communities as result of large fires.	-Moderate increase in wilderness area where succession may proceed unhampered by man.	S&P -Early stages favored on forested areas.	S&P -Early stages generally favored on forested area, but some increase of mature stands.
-Late stages favored on most rangelands.	-Largest area closed to manipulation of vegetation allowing succession to proceed unhampered by man.	-Least area in wilderness where succession of natural ecosystems may occur to climax.	S&P -Early stages favored on forested areas but less area involved than in Alt. 1.	-Late stages favored on rangelands not converted to non-native forage areas.	-Late stages favored on rangelands not converted.
S&P -Early stages generally favored in forested areas and late stages favored on rangelands not seeded to high producing exotic species.	S&P -Early stages and young stands favored on forested areas. -Late stages favored on rangelands that are not converted to non-native forage species.	S&P -Early stages favored on forested areas, probable with greater area involved than in Alt. 1.	-Late stages favored on rangelands not converted to non-native forage areas.		
-Old growth stands reduced but less rapidly than in Alt. 1.					
-Cut over area quickly regenerated as result of expanded S&PF activities.					

Table 4.19.--Wood, herbage, and browse production: estimates for 1995

National Forest System (NFS) and State and private (S&P) lands

Recommended Program High Bound	Alternatives			Recommended Program Low Bound and 5
	1	2	3	
NFS -Production of wood, herbage, and browse on productive forest lands enhanced by cultural activities, especially in the South. -Production maintained and improved on range-lands primarily through management, but also through some cultural practices but at a lower level than in Alt. 1.	NFS -Greatest production of herbage and browse on range-lands through artificial revegetation and improved range management. -Production of wood, herbage and browse on forest lands improved and maintained at high level due to intensive cultural practices.	NFS -Maintained and improved on range-lands through management with minimum improvement through cultural practices, especially in arid and semi-arid ecosystems of the West. -Least net production of wood, herbage, and browse from forest lands because of minimal cultural activities	NFS -Maintained and increased on range-lands primarily through management but also by some cultural practices. -Production of wood herbage and browse enhanced by cultural activities but less than in Alt. 1.	NFS -Production of wood, herbage, and browse on productive forest lands enhanced by cultural activities. -Maintained and improved on range-lands through management and cultural practices but at lower level than Alt. 1.
S&P				
The effects on State and private land production of wood, herbage, and browse attributable to the Program or alternative are difficult to estimate and in any case probably small. The relative levels of technical assistance provided are expected however to influence production.				

Table 4.20.--Summary of effects on vegetation

Recommended Program High Bound	Alternatives				Recommended Program Low Bound and 5
	1	2	3	4	
<p><u>Short term effects</u></p> <p>-Slow improvement of range conditions except in Southwest where actions will be more aggressive.</p> <p>-Decreases in plant and animal communities associated with old growth forest stands.</p> <p>-Diversity will begin to decrease on the more productive forest sites planted to high-yield tree species.</p> <p><u>Long term effects</u></p> <p>-Improvement of range-lands conditions.</p> <p>-Promotion of plant and animal communities associated with early successional stages.</p> <p>-Loss of plant and animal communities associated with mature stands and late successional stages on forest lands except in wilderness areas and in Alaska and Central Rockies.</p> <p>-Increase diversity on S&P lands.</p>	<p><u>Short term effects</u></p> <p>-Little change from present on most forests and rangelands.</p> <p>-Reduction in diversity and increase in production on the more productive forest and range land sites that planted to high-yielding trees or improved forage species.</p> <p><u>Long term effects</u></p> <p>-Decrease in old growth and mature stands leading to decrease in plant and animal populations dependent upon such stands.</p> <p>-Increase in forest and range land areas occupied by one or two species.</p> <p>-Increase dispersion of native and exotic plant communities leading to increased production of herbage and browse.</p> <p>-Forest and range lands would be maintained in a high productivity condition.</p> <p>-Plant and animal species dependent upon early ecological stages would be promoted nationwide.</p>	<p><u>Short term effects</u></p> <p>-Production apt to drop because of low S&P input.</p> <p>-Not much change in most forest and range lands except on range lands where livestock have been withdrawn.</p> <p><u>Long term effects</u></p> <p>-Decrease in plant and animal populations dependent upon early stages of succession.</p> <p>-Recovery of depleted rangelands will be delayed, especially in arid and semi-arid ecosystems.</p> <p>-Potential for insect and disease epidemics will be increased. Decreased net productivity from forest and range lands.</p> <p>-Major increase in plant and animal communities associated with late stages in succession or with mature and old-growth stands.</p> <p>-Forest and range lands will assume a near-natural appearance, especially on the less productive sites.</p>	<p><u>Short term effects</u></p> <p>-Decrease in diversity and increase in production on the high-producing forest and range land sites planted to high-yielding trees or improved forage species.</p> <p>-Decrease in old growth stands and the plant and animal communities associated with them especially in the Northwest.</p> <p><u>Long term effects</u></p> <p>-Decrease in old growth stands and plant and animal communities associated with them especially in the Northwest.</p> <p>-Increase in area dominated by one or two species.</p> <p>-Increase dispersion of plant communities.</p> <p>-Promotion of plant and animal communities dependent upon early successional stages.</p>	<p><u>Short term effects</u></p> <p>-Little change on most forests and range lands.</p> <p>-Some decrease in diversity and increase in production on the high-yielding forest and range land sites planted to high-yielding trees and forage species.</p> <p><u>Long term effects</u></p> <p>-Decrease in plant and animal population dependent upon early stages of succession on NFS lands.</p> <p>-Decrease in native communities on S&P lands.</p> <p>-Major increase in late successional stage plant and animal communities on NFS lands.</p> <p>-Increase in early successional stage species for both plants and animals on S&P lands.</p>	<p><u>Short term effects</u></p> <p>-Improvement of range lands in depleted condition.</p> <p>-Not much change on most forest and range lands.</p> <p><u>Long term effects</u></p> <p>-Decrease in plant and animal communities associated with old stands and loss of overstory on less productive sites on NFS lands.</p> <p>-Reduction of diversity on most productive sites.</p> <p>-Promotion of plants and animals associated with early stages of succession. Improvement of range lands.</p>

of the Program are shown in the first column. Effects of the Low Bound would be about the same as those of Alternative 5 and are shown in the last column.

Alternative 4a.--The effects of Alternative 4a upon the vegetation are not included in the tables. They would vary by geographic location, but generally would be between Alternatives 3 and 5. Cut over and catastrophically bared areas would be planted with genetically superior trees except in Alaska and the Central Rockies where artificial regeneration would be minimal. In the South, mixed hardwood-conifer stands would be converted to conifers. On western rangelands, type conversion would be confined to highly productive sites.

Species and community diversity on National Forest System lands would be maintained by natural agents or by management activities to benefit a wide variety of wildlife. On State and private lands, diversity would tend to decrease as old growth is eliminated and replaced by high-yielding young stands. The significant increase in wilderness would permit natural succession of plant communities toward climax on large areas of National Forest System lands.

Significant areas of National Forest System land would be removed from production, but cultural activities would maintain productivity of high yielding commercial forest sites. Such activities are especially important in the South. Rangeland productivity would be improved and maintained through management and cultural activities.

Cultural Resources

Both Bounds of the Program and all Alternatives will meet standards for protection of cultural resources.

The Program will increase cultural resource enhancement and interpretation. Protection and compliance levels are consistent with recreation and other resource uses. National Forest overviews will be completed by 1985; the inventory by 1990.

Alternative 1 would significantly increase interpretation, enhancement, and protection, as well as provide the highest level of inventory, compliance, and mitigation to support greater total activity. National Forest overviews would be completed by 1985 and inventory by 1990.

Alternative 2 would maintain interpretation, enhancement, and protection at current levels. Inventory would be primarily project related. Overviews would be completed by 1985.

Alternative 3 would increase interpretation and enhancement, emphasizing off-site interpretation compatible with dispersed outdoor recreation. Compliance-related cultural resource activity would be moderate to offset moderate activities in other areas. National Forest overviews would be completed by 1985 and the inventory by 1990.

Alternatives 4 and 4a would increase interpretation and enhancement and increase protection to offset increased visitor use. Cultural resource compliance work would conform to the level of other activities. National Forest overviews would be completed by 1985, and the inventory by 1990.

Alternative 5 would increase interpretation and enhancement compatible with developed outdoor recreation opportunities. It would provide current levels of cultural resource protection. It would also carry out cultural resource compliance work to conform to the level of activities in other areas. Overviews would be completed by 1985, and the inventory by 1990.

Table 4.21 is a narrative comparison of the Program with the Alternatives. Effects of the High Bound of the Program are shown in the first column. Effects of the Low Bound approximate those of Alternative 5 and are shown in the last column. Further discussion of multiple resource interaction effects relevant to cultural resources can be found in the Assessment.

Social Effects

The selection of sociological variables was based on three criteria. First, the variable had to be of central significance sociologically. Second, it had to be included in either the 1975 Social Assessment conducted by John Kelly (1975) or the Social Assessment Handbook (Gale, 1977). This assured continuity with other social impact research conducted by the Forest Service. Third, it had to be significantly related to the primary mission and goals of the Forest Service. The variables selected were aggregated into nine categories and are listed and defined in chapter 2.

These variables contain measures of cohesion, conflict, cultural, values, symbolic meanings, and activities of voluntary organizations. The effects are summarized below for each National Forest System Region. While their outlines are not identical, each deals with the impacts of salient program elements on those communities most affected in that Region.

Since the High Bound is a mixture of Alternatives by element and Region, the evaluation of sociological variables is more complex than for uniform Alternatives. Therefore, the effects of the High Bound are explained in the following Regional narratives. The effects of the Low Bound would be similar to Alternative 5 in the long term. In the short term (1981-1985) lower levels of Forest Service activities would cause effects more similar to Alternative 2.

Alternative 4a is not included in the Regional summaries, but its effects are similar to those of Alternative 4. It differs from the Recommended Program by providing full support for recreation in Regions 1, 3, and 4. The lower level of mineral development and increases in wilderness may result in negative social impacts, chiefly in timber-dependent communities. However, social differences from the Recommended Program also include less localized impacts from mineral development. Nationally, the potential contributions to energy and other mineral supplies and to reductions in housing material prices are lower than for the Recommended Program. However, employment gains from recreation and protection programs would enhance community context and stability in many counties near National Forests.

Region 1

Program High Bound.--In metropolitan counties, some economic benefits are expected from mineral expansion. There will also be some small increase in leisure opportunities relative to increasing demands for recreation, wildlife and fish, and wilderness.

Table 4.21.--Cultural resource effects: estimates for 1995

National Forest System

Recommended Program High Bound	Alternatives				Recommended Program Low Bound and 5
	1	2	3	4	
<p>-Provides maximum opportunity for management, protection, enhancement, and interpretation.</p> <p>-Protection will be substantially increased due to increased emphasis on commodity values and associated ground disturbing activity, particularly road construction, energy resource development, and, in some Regions, timber management activities. Increased activity provides greatest incidence for effects and need for professional evaluation and mitigation action. Potential for effects and need for mitigation resulting from other activities will be similar to present trends.</p> <p>-Potential adverse impacts due to increased visitor use.</p> <p>-Emphasis on dispersed recreation will require increased protection.</p> <p>-High level of recreation will result in increased management, including enhancement, protection, and interpretation.</p> <p>1985: Short-term effects will be closely tied to levels of land-disturbing activities. Increases in these activities may prevent development because of the need for protection for the future.</p> <p>1995: Long-term effects will depend on careful resolution of short-term conflicts where commodity values are highest priority. Cultural resources will require extensive protection through mitigation actions.</p>	<p>-Potential adverse impacts will be highest but opportunities for protection, enhancement, research, and identification would also be highest level.</p> <p>-Because of increased activity, provides the greatest incidence for effects and need for mitigative action. Significant sites which provide substantive evidence of past human behavior will be identified, protected and available for public information uses.</p> <p>-Increased emphasis on recreation will provide increased management opportunities with substantial enhancement due to increased interpretive efforts.</p>	<p>-Less activity in all functions could mean less impact from Forest Service activities. Projects requiring mitigation are reduced to a minimum.</p> <p>-Reduces opportunity to protect this resource.</p> <p>-Low-level market outputs likely to have less effect on the resource base, the need to consume sites would be reduced, and the status quo maintained.</p> <p>-Potential adverse impacts on cultural resources will be minimal as a result of decreased ground-disturbing activities.</p> <p>-Effects on the cultural resources by natural environmental processes will be the greatest for this Alternative. Some irreversible and irretrievable effects will occur from lack of protection, but loss should not be of great magnitude.</p> <p>-Reduced recreation management will increase opportunities for vandalism, and severely hinder efforts to inform the public.</p> <p>-Potential indirect impacts will show a moderate increase, due to increased visitor use.</p>	<p>-Adverse impacts on cultural resources will approximate the present rate. Program level will remain high.</p> <p>-Resource conflicts will be moderate, with better data collection than at present, hence an increase of resource value to the public.</p> <p>-Moderate potential conflicts from activities such as timber harvesting, wildlife habitat and range improvements and fuel management will require mitigation.</p> <p>-Program development will be moderate. Potential direct impacts due to earth-disturbing land management activities will significantly increase.</p> <p>-Slightly increased impacts with cultural resource management activity can be expected. Moderate levels of protection, research, and interpretation.</p>	<p>-Will produce the least adverse effects and create maximum opportunity for enhancement and management. Provides highest management level.</p> <p>-Potential conflicts with timber harvesting, road construction, and range improvement will be minimized due to decreases in such activities.</p> <p>-Increased nonmarket commitments would conflict with increased cultural resource protection because of vandalism, but also enhance them by allowing more interpretation and research.</p> <p>-Enhancement and public information will be provided at significant sites.</p> <p>-Potential indirect adverse impacts resulting from visitor use will show a significant increase.</p>	<p>-Moderate data collection and program development.</p> <p>-Protection and enhancement will occur at the present rate. Some irreversible and irretrievable site losses may occur from lack of inventory and protection.</p> <p>-Potential for effects and need for mitigative action will be similar to present trends.</p> <p>-Low-level recreational use provides for little cultural resource enhancement. The net effect will be negative due to reduced management work. There will be a moderate increase in potential indirect adverse impacts because of increased visitor use.</p>

In nonmetropolitan counties, recreation-access communities may experience lifestyle conflicts between locals and visitors. Continued patterns of community stability and economic viability should result from the timber program. Populations growth due to mineral expansion will be localized. The boom and bust syndrome resulting from surface mining has heavy early costs; and increases in the tax base, land values, and employment are not distributed equally among the residents. Problems with housing, crowding, leisure locale conflicts, and special consequences for minorities vary with the type of development and locality. In general, social impacts of mineral development are complex, but often significant for sparsely populated counties.

Alternative 1.--Leisure opportunities, community identity, and economies would experience an improvement. There will be a cost to health and environment caused primarily by rapid change.

Alternative 2.--A decline would occur in leisure opportunities and community identity. Effects would be more acute in rural areas than in metropolitan communities. The economies of communities that depend on nonmarket outputs would be impacted.

Alternative 3.--Community economies and leisure opportunities would be improved. Community cohesion may be reduced as new people move into small communities.

Alternative 4.--Economies of metropolitan areas might benefit from improved recreation opportunities. However, a decline in timber sales could be offset partially by economic growth in other portions of the economy. Leisure opportunities and community economy would improve in nonmarket-dependent nonmetropolitan areas. However, significant decline might occur in market-dependent nonmetropolitan areas. Major shifts in economic structure and community identity would be likely in high-market and high-nonmarket communities.

Alternative 5 and Program Low Bound.--Leisure opportunities would decline slightly. The quality of these opportunities and the safety in using them might decline, as a result of decreased emphasis on protection. Health and environment are expected to improve.

Region 2

Program High Bound.--In metropolitan counties, leisure opportunities are expected to increase for all kinds of forest-based recreation.

In nonmetropolitan counties, the usual leisure-related impacts are intensified near large winter sports developments. Some communities will be changed greatly and lifestyle conflicts will be intensified by higher living costs. Community economies will be strengthened by some recreation development. Impacts from mineral development will be more long-term. "Boom town" effects are not expected here. However, many of the impacts will be detrimental to current community styles, contexts, and values. The effects from timber, range, and recreation activities in counties not heavily impacted by minerals and large recreation developments will be generally stable and positive.

Alternative 1.--Leisure opportunities would improve for market-dependent communities. Minority employment opportunities would also improve.

Alternative 2.--Impacts would be similar to Region 1. However, in Region 2, this Alternative has potential for adverse impacts on health and environment.

Alternative 3.--Impacts would be similar to Region 1, but population growth would be more heavily impacted.

Alternative 4.--Impacts would be similar to Region 1. Greatest impacts would occur in those counties that depend on forest outputs.

Alternative 5 and Program Low Bound.--Community economies and leisure opportunities would improve. Both metropolitan and nonmetropolitan areas might experience some congestion, crowding, pollution, and building in areas dependent on nonmarket outputs.

Region 3

Program High Bound.--In metropolitan counties, increased leisure opportunities by 1995 with possible health and environment problems due to crowding near urban centers.

In nonmetropolitan counties, recreation provisions could yield negative effects on community context. Community stability will be supported by activities in the timber element. Negative impacts from possible mineral development will include housing costs and availability, health, environment, community context, and those mentioned above associated with rapid localized growth. However, local economies may be strengthened.

Alternative 1.--Effects will be similar to those reported in Regions 1 and 2.

Alternative 2.--Most impacts would be similar to those in Regions 1 and 2. Declines in community economy and identity might result from the decline in the range element.

Alternative 3.--Kinds of impact would be similar to those of Alternative 1, but the degree of impact would be less.

Alternative 4.--Impacts would be similar to those in Regions 1 and 2. Metropolitan areas would experience a decline in housing quality.

Alternative 5.--Present trends would continue. Some adverse effects on health, environment, esthetics, and law enforcement would occur in both metropolitan and nonmetropolitan counties.

Region 4

Program High Bound.--In metropolitan counties, the quality of leisure opportunities would increase.

In nonmetropolitan counties, impacts of mineral and timber activities are the same as in Region 3. Improvements in community viability and general stability from the range and timber elements are anticipated. Increases in leisure opportunities may reduce community context in some places.

Alternative 1.--Health, environment and community identity would be improved in metropolitan counties. In nonmetropolitan counties, community economies would be improved, but there would be negative impacts on health, environment, housing quality and community identity. Health, environment, community economy and leisure opportunities would be improved in high-market, low nonmarket communities.

Alternative 2.--All sociological variables in both metropolitan and nonmetropolitan counties would be negatively affected. High nonmarket counties would undergo negative impacts on community identity, economy, health, and leisure opportunities.

Alternative 3.--Metropolitan counties would have increased leisure opportunities, with mixed impacts on health and environment. Impacts would be greatest on nonmetropolitan counties with both high-market and high nonmarket dependence. Effects on health and environment, leisure opportunities, and community identity would be mixed. Economies in counties that depend heavily on National Forest market outputs would be improved.

Alternative 4.--Health, environment, and leisure opportunities in metropolitan counties would improve. Effects on nonmetropolitan areas that depend heavily on National Forests would be similar to those in Regions 1 and 2. Health, environment, leisure opportunities, and community economy would improve in counties that depend on National Forest market outputs.

Alternative 5 and Program Low Bound.--This Alternative would affect most areas in this Region. Mineral activity would benefit community economies. Negative impacts would be likely in protection, health, and environment.

Region 5

Program High Bound.--Metropolitan counties on National Forests are important for recreation in California. However, increased travel costs and shortages of fuel are expected to alter recreation patterns. Fire suppression and watershed management are also quite important to environments of urban California counties.

In nonmetropolitan counties the wilderness increase is expected to improve leisure opportunities, but it also creates problems for fire suppression near some communities. Wilderness is a political issue in the State, with conflict between statewide environmental interests and localities dependent on timber outputs. Increased wildlife and fish programs will enhance recreation opportunities and lessen conflict between Native Americans with anadromous fishing rights and others who fish for commercial gain or sport. The slight increase in timber harvesting in the early part of the 1980's is expected to support community stability.

Alternative 1.--Leisure opportunities, health and environment would increase in urban areas. Nonmetropolitan counties would experience fairly extensive impacts. Leisure opportunities and community economy would improve. Market-dependent communities in north and north-central California would gain from timber and range programs.

Alternative 2.--Leisure opportunities and community identity would decline. Nonmetropolitan counties, especially in the north and the Sierras,

might experience a decline in economy, community identity and leisure opportunities.

Alternative 3.--Most communities would experience positive impacts, but the magnitude would not be great. Health and environment would improve. Leisure opportunities and community economy would improve slightly.

Alternative 4.--In metropolitan communities, leisure opportunities would improve. Nonmetropolitan counties that depend only on nonmarket outputs from National Forests would experience improvements in community economy and leisure opportunities. Communities dependent on both market and nonmarket outputs would experience problems similar to Regions 2, 3, and 4.

Alternative 5 and Program Low Bound.--Metropolitan counties in this Region would continue to benefit from leisure opportunities. Existing trends are expected to continue. Economies of communities in north and east-central California that depend on market outputs from National Forests might be improved.

Region 6

Program High Bound.--In metropolitan counties there will be little effect. Some economic benefit is expected for population centers with major wood products industries.

In nonmetropolitan counties the program for timber should contribute to community viability by increasing income levels and employment. Impacts on Native Americans are likely to be mixed, with the wildlife and fish program providing some benefits.

Alternative 1.--Improved leisure opportunities would be expected for all communities. Local community economies would benefit, but community identity might suffer.

Alternative 2.--Economies, health, and environment would decline in metropolitan communities that depend on market outputs from National Forests. Leisure opportunities would decrease in some nonmetropolitan counties.

Alternative 3.--The impacts of this Alternative would be similar to but smaller than those of Alternative 1.

Alternative 4.--This Alternative would expand leisure opportunities. Most negative impacts would occur in nonmetropolitan communities. Increased leisure opportunities would stimulate economic growth in the eastern portion of the Region. However, it is questionable that all of the decline due to reduced market outputs could be offset by private supply.

Alternative 5 and Program Low Bound.--Metropolitan counties with low market dependence would benefit from increased dispersed recreation. Economies of metropolitan counties that depend on market outputs might suffer. Existing trends in health, environment, leisure opportunities, and community identity would continue in nonmetropolitan counties.

Region 8

Program High Bound.--In the Southeast most timber is in small private holdings, and timber supplies from National Forests are less critical to the overall economy than elsewhere.

In metropolitan counties leisure opportunities will be enhanced since National Forests are an important source of forest recreation, but the growing population of users may cause crowding and resource deterioration.

In nonmetropolitan counties that provide access to major recreation areas, mixed impacts as already described are likely. The long-term shift to private harvesting is expected to create social and environmental problems. Unless forest management and reforestation are supported by prices and other incentives, the long-term loss of forest resources may be severe. There should be short-term employment and income gains from recreation facility rehabilitation in several localities. As in other Regions, the mixed impacts of mineral development will be specific to the areas and types of mining. Past history has not been encouraging in anticipating great benefit to local communities from an upsurge in mining activity.

Alternative 1.--Effects on community economy, identity, and minorities would be positive. Some decline might occur to community identity. Economic activity would increase in communities that depend on forest outputs. Economies of communities dependent on high market outputs would benefit, but leisure opportunities, health, and environment there would decline.

Alternative 2.--The decrease in market outputs would have negative economic impacts. Leisure opportunities would decline. Communities dependent upon State and private forest lands would experience similar impacts of a smaller scale.

Alternative 3.--Economic growth would increase in counties dependent upon National Forest System lands. Leisure opportunities and economies of counties with high dependence upon privately owned forest lands might benefit. Leisure opportunities in other counties would increase.

Alternative 4.--Increased market outputs from private lands would have the most significant effects. Metropolitan counties would benefit from increased leisure opportunities on National Forest lands.

Alternative 5 and Program Low Bound.--Existing trends would continue in counties that depend on forest outputs. A large increase in population would cause a decline in quality of leisure opportunities.

Region 9

Program High Bound.--In metropolitan counties social impacts will be slight. Leisure opportunities will increase somewhat.

In nonmetropolitan counties impacts are localized and related to recreation development, hardwood utilization, and other forest development. Mineral expansion will create mixed impacts in adjacent areas, but restrictions to deep mining--if continued--tend to minimize environmental degradation. Social impacts in the Northeast tend to be dispersed or of low intensity except where new mills, mines, and recreation developments are located.

Alternative 1.--Leisure opportunities in metropolitan areas would improve slightly. Economies and leisure opportunities in nonmetropolitan counties that depend on nonmarket outputs from National Forests would increase. Some traffic and crime problems might increase. Housing and community economies would improve in nonmetropolitan counties that depend on National Forest timber.

Alternative 2.--Slight declines might occur in economies and leisure opportunities in the few metropolitan communities with market dependencies. Nonmetropolitan communities that depend on National Forests would experience serious declines in community economy, health care, minority opportunities, and leisure opportunities.

Alternative 3.--Impacts upon metropolitan counties would be minimal. In nonmetropolitan counties with either market or nonmarket dependence, community economies, leisure opportunities, health, and environment would improve.

Alternative 4.--Effects would be mixed under this Alternative. Metropolitan counties might experience some improvement in leisure opportunities. Nonmetropolitan, market-dependent counties might experience some economic growth and improved leisure opportunities. Counties dependent on both market and nonmarket outputs would experience mixed effects. Improved opportunities might be offset by declines in other variables.

Alternative 5 and Program Low Bound.--This Alternative would simple extend current trends in the Region. Economies and leisure opportunities would improve in nonmetropolitan counties that depend on National Forest outputs.

Region 10

Program High Bound.--In metropolitan areas leisure opportunities and economies will increase slightly.

Nonmetropolitan areas will obtain stability because current timber harvest outputs from National Forests will be maintained. Increases in wildlife and fish should benefit minorities and community economies dependent on fishing and related outdoor recreation opportunities. Recreation outputs will have positive effects.

Alternative 1.--Most effects would be positive. Health, environment, and leisure opportunities would improve somewhat. Intensive land management might create some conflicts.

Alternative 2.--Leisure opportunities, health, and environment would be negatively affected.

Alternative 3.--This Alternative would have relatively few impacts, and these would resemble those of Alternative 1.

Alternative 4.--Effects would be similar to those expected under Alternative 1.

Alternative 5 and Program Low Bound.--Leisure opportunities might be improved. Effects on minority opportunities would be slight.

Social Well-Being

The analysis of social well-being employed the data generated by the National Interregional Multi-Resource Use Analytical System. The effects of the Recommended Program--a mixture of Alternative Program Directions--are approximately those of Alternative 3 at the High Bound and Alternative 5 at the Low.

Two indicators of social well-being are:

Futures foregone.--This variable considers the degree to which choice opportunities or futures are foregone. Social well-being is served when futures are foregone as little as possible.

Conflict polarization.--This variable considers the degree to which management alternatives tend to polarize affected groups and undercut social well-being. Polarized groups threaten each other and tend to block each other's choices.

Futures foregone, conflict polarization, and the two combined are shown in the following table. The Alternatives are ranked one through five. The lowest score represents the most desirable.

<u>Alternatives</u>	<u>Futures Foregone</u>		<u>Conflict Polarization</u>		<u>Social Well-Being</u>	
	<u>Score</u>	<u>Rank</u>	<u>Score</u>	<u>Rank</u>	<u>Score</u>	<u>Rank</u>
1	520	3	53	4	573	3
2	525	4	52	3	577	4
3*	501	1	51	2	552	2
4	591	5	52	3	643	5
5**	505	2	46	1	551	1

* Approximates High Bound.

** Approximates Low Bound for 1990 and beyond.

From a social well-being point of view, Alternatives 5 and 3 are more desirable than 1, 2, and 4. Alternative 4 is the least desirable.

Employment, Income, and Value Added

Effects on employment, income, and value added are based on the results of economic impact analyses. Effect estimates are from input-output models for multi-State areas which approximate Forest Service Regions.

Employment.--This is measured as person-years (2,000 work hours). A person-year may be one person working for a year or several people working a portion of a year.

Income.--This is measured as dollar compensation to households. It includes wages, salaries, profit, rents, royalties, etc.

Value added.--This is measured as the dollar value of all primary inputs such as payment for land, labor, and capital used in the production of products sold. The value-added method of estimating Gross National Product (GNP) is the summation of payments to governments (taxes), households (income), and to industry investments (depreciation) resulting from industrial sales in the Region.

In the following comparisons, the Recommended Program and Alternatives are ordered in increasing values of employment, income, and value added for 1995.

Employment

Year	Recommended Program		Alternatives					
	Low	High	1	2	3	4	4a	5
(Thousand person-years)								
1985	660	820	770	640	840	810	850	760
1995	830	1,040	900	600	940	870	970	830

Income

Year	Recommended Program		Alternatives					
	Low	High	1	2	3	4	4a	5
(Millions of Dollars)								
1985	13,450	17,000	15,200	13,000	17,000	16,000	17,000	15,400
1995	17,000	21,000	18,100	12,600	19,100	17,200	19,000	17,000

Value added

Year	Recommended Program		Alternatives					
	Low	High	1	2	3	4	4a	5
(Millions of Dollars)								
1985	14,600	18,400	16,500	14,100	18,400	17,400	18,400	16,700
1995	18,500	23,100	19,700	13,700	20,800	18,800	21,300	18,500

Comparison analysis information developed in the chapter displays differences between the principal alternatives considered and the Recommended Program. Evaluation of these differences relative to the final decision process and formulation of the Recommended Program are described in chapter 5.

CHAPTER 5:

Evaluation and Determination of the Recommended Program



CHAPTER 5: Evaluation and Determination
of the Recommended Program

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CHAPTER 5: EVALUATION AND DETERMINATION OF THE RECOMMENDED PROGRAM

This chapter summarizes chronologically the evaluations that helped determine the Secretary of Agriculture's 1980 Recommended Program as described in chapter 1. It highlights the evaluations stemming from:

- Public comments received on the draft RPA documents that were circulated early in 1979; 1/
- Trial Program No. 1;
- Trial Program No. 2; and presents
- The final rationale for the Recommended Program resulting from the cumulative evaluations.

The criteria used in evaluating and selecting Alternatives are detailed in chapter 2. The criteria include public comments on the draft documents, the findings of the 1979 Assessment, the requirements of the National Environmental Policy Act and other legal requirements, cost effectiveness, social values, and administrative policy direction. In determining the final program, tradeoffs had to be made among interacting, and often conflicting, criteria.

PUBLIC INVOLVEMENT HIGHLIGHTS

About 45 percent of the respondents who commented on the draft documents stated a preference for one of the five displayed Alternative Program Directions (APD's), and 15 percent suggested a modification. Nationwide, Alternatives 2 and 5 received the least support. Comments tended to be regional rather than national in scope. Opinions from the East, West, and Alaska differed considerably.

East

APD's 3 and 4, alone or in combination, received the most attention. Moderate cost and production levels, improvements in State and Private Forestry, and Research programs, and the high wilderness and wildlife outputs

1/ See appendix B: "Public Involvement in the RPA Assessment and Program Development Process."

in APD 4 were commonly stressed. Disfavor was expressed about reduction of commodity production from National Forest System (NFS) lands in ADP 4.

Many respondents said APD 1 was the best alternative, but that because of current economic conditions they did not select it. Some reasons for rejecting APD 1 were "high costs," "impossible to achieve," and "negative environmental impacts." Respondents supporting APD 1 cited its multiple-use orientation and full utilization of the potential of the land.

Very few respondents in the East favored APD 2. Those who did cited its low cost. Reasons for rejecting it revealed respondent concerns about APD 2's ability to meet stewardship and future commodity requirements, and the possibility of environmental degradation.

West

APD 3 was preferred in most areas with APD 4 the choice in the Southwest. Overall, APD's 1 and 4 received about equal support. Generally, respondents felt APD 3 was a balanced multiple-use program. The main reasons for supporting APD 1 were its high market outputs combined with environmental protection. Support for APD 4 centered on increasing current levels of fish and wildlife, recreation, and State and Private Forestry programs.

Alaska

APD 1 was preferred far more often in Alaska than in any other region. Reasons most cited were the need to support the current level of timber production and the need for a high level of environmental protection. APD 4 also was much favored because of wilderness acreage and increases in State and Private Forestry programs. APD 3 received slightly less support than APD 4; many respondents favored its moderate program for all resources. APD's 2 and 5 received minimal support.

Modifications of Alternatives

Most respondents who suggested modifications of the alternatives wanted to increase or decrease emphasis on a particular element in one of the five. However, others suggested a mix of market and nonmarket output levels different from any of the given APD's. Three modified alternatives were often mentioned.

One called for moderate market and high nonmarket outputs from National Forests plus increased emphasis on Research, and State and Private Forestry programs. This modification was suggested by individuals who wanted special emphasis on recreation and wildlife, and by individuals and nonmotorized recreation groups who wanted special emphasis on wilderness, Research Natural Areas, fish and wildlife, and intensive management of already roaded areas. This mix also received support through congressional response to the draft. It was pointed out that no alternative provided for substantial market outputs by concentrating investment on productive National Forest System lands appropriate for intensive management, with low investment on lands less suitable for such management. It was suggested that restructuring and concentrating investments would help to reduce the high cost of intensive management as well as offer incentives to private and public institutions to develop innovations in intensive natural resource management and forest products

utilization. The congressional response also requested the Department of Agriculture to develop an alternative that provided current or slightly increased levels of market outputs, and high nonmarket outputs, at a cost comparable to Alternative 3. This modification is designated as modified APD A in figure 5.1 which compares output levels for alternatives.

A second modification was recommended by commodity-service producing groups, motorized recreation groups, and some State agencies. They suggested mixes of high market outputs from NFS and S&PF programs, and low to moderate nonmarket outputs. This is shown as modified APD B in figure 5.1.

The third major modification, suggested by some State agencies, combined moderate market and nonmarket outputs from National Forests with high level S&PF, Research, and Human Resource Programs. This is displayed in figure 5.1 as modified APD C.

Comments on National Forest System Programs

Many respondents felt that balanced uses are necessary on National Forest System lands. They suggested that more emphasis be placed on the private sector to produce market goods, while giving stronger environmental considerations to National Forest resources through better management practices, and stricter controls. Increased consideration was suggested for wildlife and fish habitat and associated range values; water quality and quantity; and expansion of developed recreation and other resource opportunities where demands are increasing, particularly near population centers. Reviewers felt the use of chemical vegetation and pest controls should be limited to the most critical situations and that research should develop biological and natural controls.

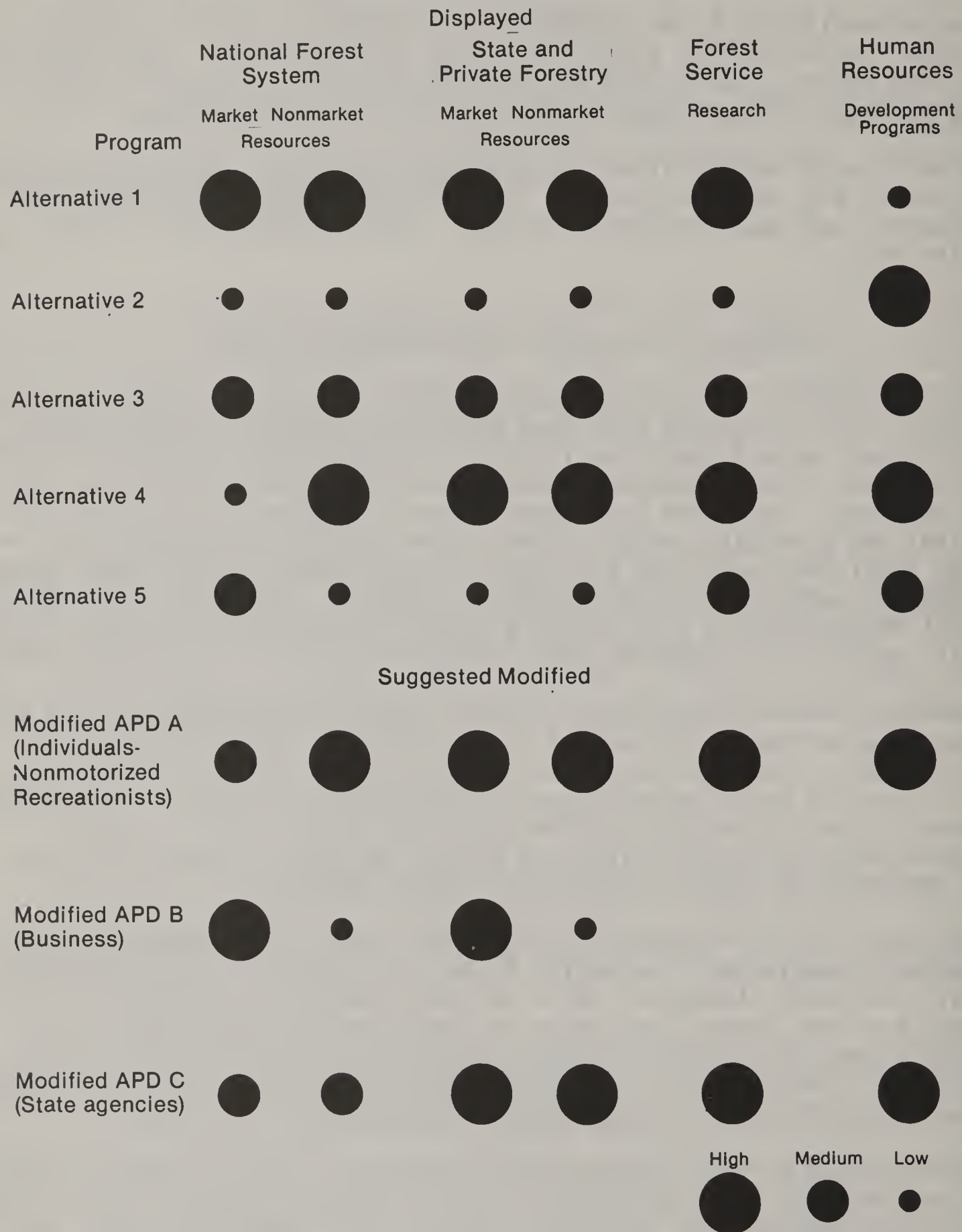
Commodity-interest respondents in most Forest Service Regions urged that the National Forest System be managed to increase its share of market goods--especially timber, range, and minerals--to help offset increasing commodity demands. They also urged restrictions on wilderness expansion. Some comments recommended increasing production from State and private lands. A few commodity-interest respondents from the Pacific Northwest favored departure from the nondeclining even-flow policy of timber harvest.

Most preservation-interest groups stressed that the function of public land management should be to emphasize nonmarket outputs, particularly those not readily available elsewhere, while shifting commodity development to private lands, but with strong assurances for environmental protection. They also stated a need for further research support for nonmarket resources and that the Forest Service should capture unique opportunities, such as preservation of more natural areas through old-growth ecosystem protection.

A modification of the preservationist position, primarily from the western regions, proposed that developed, highly productive National Forest System lands be intensively managed for market outputs, thus supporting local community economies. Undeveloped lands would be managed primarily for nonmarket services.

Figure 5.1

Comparison of Output Levels of Displayed and Suggested Modified Alternative Program Directions



Note: The medium output level corresponds to the current trend of levels of output for market and nonmarket resources. However, the actual or absolute levels of output from State and Private Forestry, Research and Human Resources are very much lower than for National Forest System. The low and high symbols represent relative differences from the actual medium level.

Comments on State and Private Forestry Programs

The State and Private Forestry program received broad support from many sectors. Respondents called for greater emphasis than is currently being given to the management of nonindustrial private lands; agreed that this would require strong Federal-State cooperation.

In general, noncommodity-oriented respondents favored a strengthened S&PF program that would shift much of the commodity production (primarily timber) from NFS lands to the private sector and thereby release the National Forests for nonmarket uses.

Commodity groups felt that increased outputs are necessary from private lands as well as NFS lands to meet future needs, particularly timber. Since landowner objectives may be uncertain and changeable, some respondents were concerned about national dependency on private lands to produce substantial portions of the Nation's needs in either market or nonmarket commodities.

State forestry agencies, in particular, emphasized that a stronger State and Private Forestry program is needed regardless of any conscious effort to shift the production of market outputs from National Forest System lands. They stated there is need for greater emphasis on technical assistance, for the application of technology, and on more education to increase public and landowner awareness of opportunities in multiresource land management. In the eastern half of the Nation, many respondents stressed the need for increased attention to hardwoods as an energy source and a primary source of timber products. An expanded program of multiresource management, application of new technology, and economic management was requested. A larger role for State and Private Forestry programs, but without increased Federal controls, was called for.

Comments on Research Programs

About 20 percent of all respondents proposed increases in Forest Service Research programs.

Most frequently proposed areas of increased Research above present levels were:

- Forest biomass production and the use of wood fiber as an energy source while preserving other market and nonmarket values.
- Wildlife habitats, including linkages to range improvement to enhance both wildlife habitat and livestock grazing values.
- Timber utilization to extend wood supplies, including better harvesting techniques, better primary and secondary processing techniques, conservation in construction without loss of strength, and increased life for wood already in use.
- Silvicultural practices to increase forest growth and lumber yields.
- Utilization of eastern hardwoods and management techniques to enhance nonmarket values from eastern hardwood forests (some western hardwood utilization is included).

- Forest pest control--biological controls were favored with environmentally safe chemicals for limited supplemental controls.
- Water quality (nationwide) and water yield (parts of the West).
- Fire management (Pacific Southwest and Southeast).
- Air pollution impacts on forest environments (Pacific Southwest).
- Habitats for salmon (Alaska and Pacific Northwest).

Comments on Policy Issues

Timber supply.--Respondents generally favored continuation of present policies, including nondeclining even flow, more intensive management on the most productive sites, more emphasis on research and development of wood fiber as an energy source, utilization of hardwoods, and research ways to export finished wood products instead of raw logs.

Use of chemicals.--Most respondents accepted limited use of pesticides and herbicides in an environmentally safe way and many wanted alternative pest control methods. More research on the use of chemicals and alternative methods of vegetation and pest control was requested.

Consumer payments for nonmarket goods and services and the financing of capital investments.--Comments favored higher fees and more capital investments, both from National Forest receipts and private sources. Respondents also stated that National Forest receipts should generally be returned to the program where they originated.

Recreation, forage, and minerals.--Respondents favored: (1) a continuation of present recreation policy with emphasis on developed recreation near urban areas, while leaving remaining areas for dispersed recreation; (2) improvement in rangeland conditions; and (3) support for energy and nonenergy mineral exploration and development. Need for environmental safeguards in carrying out forage and mineral activities was emphasized.

Eastern National Forests.--Many respondents wanted to increase purchases of land for eastern National Forests. The commodity-interest respondents preferred management for timber production or balanced multiresource outputs. Others wanted the eastern National Forests managed for production of nonmarket goods and services.

Planning and development for nonindustrial private and non-Federal public forest and rangelands.--Respondents favored expansion of cooperative efforts to improve forest management on small, private ownerships and encouraged expanded State planning efforts for these same lands. Respondents agreed that any Federal financial or technical assistance should be based on sound State plans.

Several new issues were suggested. They varied by subject matter and by the geographic location of the respondent. Issues most frequently suggested included wildlife and fish habitat; improvement of water quality (nationwide) and water production and allocation in the West; appropriate levels of wilderness; and application of silvicultural systems.

The first trial program was formulated by Forest Service Regional Foresters and Area Directors for each Region and Area building on the results of an evaluation of the present net worth of resource element increments as well as other criteria that were generally demand oriented. The general categories of criteria presented in the draft "Alternative Program Directions 1981-2030" were: opportunities to contribute to national needs; national direction; environmental assessment; and public involvement. The result of this effort was an essentially unconstrained proposal that reflected the Regional Foresters' and Area Directors' perceptions of regional and area demands, resource potentials, public comments, and environmental requirements. Since policy issues had not been resolved then, the trial program was not constrained by decisions made on these issues. The Research program was formulated by a special task force at the national level.

National Forest System Program Directions

As a starting point for selecting regional resource programs, an economic analysis was made by the Forest Service Chief's staff to determine a mix of alternative program directions, by element, that had the highest positive present net worth (see table 5.1). An analysis to determine an appropriate discount rate suggested that 4 percent be used. ^{2/} Discount rates of 7-1/8 and 10 percent were also used to evaluate the sensitivity of the discount rate. Using the present net worth criteria, some Regions would have no program in some resource areas.

From this base, determined solely by economic analysis, Regional program increments were added by the Regional Foresters to respond to the Assessment findings, environmental considerations, major policy issues, and the input from public involvement. In addition, the Regional Foresters were required to ensure that their proposed programs met legal requirements and that all planned resource goals were feasible and compatible.

State and Private Forestry Program Directions

Alternative Program Direction 2 was the base from which the State and Private Forestry program proposals were built by Area Directors in the East and Regional Foresters in the West. This Alternative represents the level below which there could be no effective coordinated State and Private Forestry program. APD 2 places emphasis on technical rather than financial assistance and contains no Federal funds for rural fire prevention and control, urban forestry assistance, or general forestry assistance.

Regions and Areas were instructed to analyze their State and Private Forestry programs using public response, input from State Foresters, and the findings of three major studies: (1) the draft 1979 RPA Assessment, which clearly displayed the importance of nonindustrial private forest and rangelands in meeting the Nation's needs for natural resource products and services; (2) the USDA Interagency Committee report "The Federal Role in the

^{2/} See appendix C (Economic Analyses) for details of procedures used.

Table 5.1.--Alternative program directions which showed the
highest positive present net worth*

Resource element	National Forest System Regions								
	1	2	3	4	5	6	8	9	10
Recreation	3	4	4	4	4	4	4	4	1
Wilderness	4	4	3	4	4	4	2	1	2
Wildlife and fish	3	1	2	4	1	3	3	3	1
Range	4	2	2	4	2	2	0**	0**	N/A
Timber	2	0**	2	0**	3	5	1	0**	0**
Water	2	2	2	2	2	2	2	2	2
Minerals	1	1	1	1	0**	0**	1	1	0**

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* Costs and benefits were discounted using a 4 percent rate--also support costs are prorated among resource elements.

** Where zero appears, none of the alternatives provided discounted benefits greater than discounted costs.

Conservation and Management of Private Nonindustrial Forest Lands, January 1978," which emphasized the need for Federal assistance and service programs for the private sector; and (3) the Society of American Foresters task force study report "Improving Outputs from Nonindustrial Private Forests, March 1979," which also supported an increase in the Federal assistance programs.

Physical-biological, economic, and social criteria for developing the State and Private Forestry program are discussed in chapter 2.

Research Program Directions

Alternative Program Direction 2 was selected as a base upon which to build the Research program. This Alternative represents the minimum below which amounts of management and resource use technology would be considered inadequate to meet minimum future needs for protection of natural resources.

A special task force used the following guidelines, and an assessment of past and currently proposed research, to formulate evaluation criteria for the Research portion of the Forest Service Program:

- The assessment of resources shall be considered for planning Research programs.

- While the program selected for Research must be responsive to the needs of National Forest System and State and Private Forestry programs, Research must also serve other clientele.
- A level of research should be developed that aims at efficiently meeting the Nation's resource needs with minimum adverse environmental impact.
- The national and regional programs for Research prepared in 1978 were recognized as the best available general statements of research priorities. However, the RPA Assessment results should be used to modify the 1978 estimates of the priorities. These priorities include:
 - extending timber supplies
 - integrated pest management
 - tropical forestry
 - riparian habitat
 - international trade
 - biomass for energy
 - desertification
 - research requirements under Section 6, National Forest Management Act
 - anadromous fish
 - forestry practices on new native claim lands in Alaska
 - western range, and
 - basic research.
- Program selection criteria used by other public research organizations (National Science Foundation, National Institutes of Health, etc.) should be reviewed and evaluated.
- Research needs of major users (public and private) of Forest Service research should be analyzed to identify unique needs of specific user groups.
- A procedure must be developed for evaluating the responsiveness of alternative research programs to research needs stated or implied by national and regional research plans, the Assessment, Alternative Program Directions for National Forest System and State and Private Forestry, Section 6 of the NFMA, and other relevant directions.

Assessment of past and currently proposed research:

- Analyses by other agencies of benefits from research that is closely related to the type of research done by the Forest Service was reviewed.
- The long-term association of forestry research level to resource production (e.g., percent of sales or production budget) and trends in other research versus productivity for various industries (e.g., chemical, electronics, agriculture, etc.) was evaluated to establish relationships of research investment versus production value.
- Benefits were determined for selected past and proposed Forest Service research.

The task force identified four types of criteria of potential use in evaluating the research program proposals: (1) response to needs; (2) contribution to productivity or other returns; (3) response to national policy; and (4) relation to historical trends. In the case of forestry research, decisions based upon any or all of the four criteria indicated support for a substantial increase in effort.

Summary

Using the program direction provided for the National Forest System and State and Private Forestry, Regional Foresters and Area Directors developed their recommended programs and presented them to the Chief and his staff at a meeting in Portland, Oregon, on July 20, 1979. The Research program, developed by the task force at the national level, was also presented at the meeting. Table 5.2 displays the mix of alternative program directions, by element, for National Forest system. Table 5.3 displays a summary of outputs or activities and total costs for the National Forest System, and table 5.4 displays corresponding data for State and Private Forestry, resulting from Trial Program No. 1. Each of the recommended programs presented was supported by an evaluation of environmental effects. These individual Regional evaluations, on file with the Forest Service, served as a principal source of information throughout the development of the Recommended Program.

Table 5.2--Alternative program directions proposed by
Regional Foresters

Trial Program 1

Resource element	National Forest System Regions								
	1	2	3	4	5	6	8	9	10
Recreation	3	4	4	3	4	3	4	4	1
Wilderness	4	4	3	3	4	3	4	1	2
Wildlife and fish	1	1	4	1	1	3	3	3	1
Range	3	4	3	3	3	3	5	3	0
Timber	3	4	3	3	5	3	3	3	2
Water	4	4	3	3	3	3	3	3	1
Minerals	1	1	1	1	3	3	1	1	3

Table 5.3.--Projected National Forest System program outputs or activities, and total costs
Trial Program No. 1

Program element and output/activity	Unit of measure	Base year 1978	Annual units		
			1981	1985	1995
RECREATION					
Developed recreation use (Includes VIS)	Million recreation visitor days	79.6	84	102	122
Dispersed recreation use (Includes Wildlife & Fish)	Million recreation visitor days	130.2	140	165	196
WILDERNESS					
Wilderness management	Million acres	15.3	28	35	35
WILDLIFE & FISH					
Wildlife habitat improvement	Thousand acre-equivalents	2,333	4,206	5,690	6,004
RANGE					
Grazing use (livestock)	Million animal-unit months	9.9	10.0	10.2	10.5
TIMBER					
Programmed sales offered	Billion board feet	12.2	11.9	12.2	13.2
Reforestation	Thousand acres	411	471	360	49
Timber stand improvement	Thousand acres	420	457	392	277
WATER					
Water meeting quality goals or higher	Million acre-feet	370	410	420	420
MINERALS					
Minerals leases and permits	Operating Plans	14,500	18,565	25,656	30,435
HUMAN & COMMUNITY DEVELOPMENT					
Human resources programs	Thousand enrollee years	14.8	12	19	19

Table 5.3.--cont'd.

Program element and output/activity	Unit of measure	Base year	Annual units		
		1978	1981	1985	1995
PROTECTION					
Fire management effectiveness index	Dollars/ thousand acres	1,111	1,190	1,260	1,230
Fuelbreaks & fuel treatment	Thousand acres	392	307	353	287
LANDS					
Land purchase and acquisition (excludes exchange)	Thousand acres	117	237	231	95
SOILS					
Soil & water resource improvement (improved watershed condition)	Thousand acres	4.2	77	46	25
FACILITIES					
Road construction/reconstruction (arterial, collector)	Miles	686	1,180	748	1,264
COSTS					
National Forest System - Washington Office	Million dollars	--	54.2	68.1	70.3
Total appropriated 1/	Million dollars	1,422	1,938.4	2,071.5	2,152.0
Allocated funds 2/	Million dollars	244	264.3	365.6	4.0
Total NFS	Million dollars	1,666	2,202.7	2,437.1	2,156.0

1/ NFS Appropriated Funds include all YCC, Cooperator, and NFS Washington Office funds.

2/ NFS Allocated Costs include YACC and other human resource programs, O&C Grants, Land and Water Conservation, and other funds. Costs exclude payments to State and Counties, and Federal Highway Funds.

Table 5.4.--Projected State and Private Forestry program
outputs, activities, and total costs

Trial Program No. 1

Program element and output/activity	Unit of measure	Base year	Annual units		
		1978	1981	1985	1995
Timber					
Reforestation (RFA, FIP, ACP)	Thousand acres	326	840	1220	1300
Timber stand improvement (RFA, FIP, ACP)	Thousand acres	275	640	740	1030
Timber prepared for harvest	Million cubic feet (MMCF)	225	330	385	545
Woodland owners assisted	Thousand owners	165	260	300	365
Improved utilization of wood	Million cubic feet (MMCF)	164	225	235	270
Human and community development					
Technical assistance for urban and community forestry	Thousand urban areas	2.8	3.5	5.5	7.2
Protection					
Insect & disease management surveys	Million acres	600	460	640	670
Fire loss on protected area	Thousand acres burned	1700 1/	1640	1510	1430
Water, minerals, lands, and soils					
State Forest Resource Planning	Million acres	N/A	185	165	190
Cooperative technical assistance for landowner forest management plans	Million acres	3.2	4.2	5.2	5.9
COSTS					
State and Private Forestry					
Total appropriated 2/	Million dollars	80	133.4	157.3	172.9
Allocated funds 3/	Million dollars	37	54.6	69.2	77.7
Total State and Private Forestry	Million dollars	117	188.0	226.5	250.6

1/ State and Private Forestry-Cooperative Fire Loss base figure is calendar year 1977.

2/ Projected estimates of funds appropriated to the Forest Service for cooperative forestry assistance under P.L. 95-313.

3/ Projected estimates of funds appropriated to other USDA agencies for programs which receive assistance from the Forest Service and State forestry agencies, including (1) forestry practices under the Agriculture Conservation Program and the Forestry Incentives Program funded through the Agricultural Stabilization and Conservation Service, (2) Rural community fire protection funded through the Farmers Home Administration, and (3) funds allocated to the Forest Service by the Soil Conservation Service for the forestry aspects of watershed planning, flood prevention, river basin surveys and investigations, and resource conservation and development.

TRIAL PROGRAM NO. 2

Directions were prepared by the Washington Office Chief's staff after the Portland meeting to ensure national consistency in developing resource programs that responded to the Assessment and public input, and at the same time provided for environmental protection and legal requirements.

National Forest System Direction and Evaluation

Directions to Regional Foresters to achieve consistency in National Forest System program:

Program element	Description Output/Activity	Directions
Recreation	Developed recreation use (includes VIS)	Develop and maintain concentrated use sites where demand exists, especially near urban areas
	Dispersed recreation use (includes Wildlife & Fish)	Identify, manage, and promote significantly increased use of a wide variety of outdoor recreation opportunities.
Wilderness	Wilderness management (FSM & RSM)	Provide for a substantial increase in wilderness use, protection of wilderness values, reduction of conflict and a greater opportunity for a variety of experiences in under-utilized wildernesses.
Wildlife & fish	Wildlife habitat improvement	To meet the 1995 demand in the RPA Assessment, provide for a 20 percent increase in hunting opportunities by restoring degraded habitat and improving habitat. Also, provide habitat diversity, maintain and enhance habitat for endangered and threatened species, and provide for appreciative wildlife use at developed recreation sites and VIS.
	Fish habitat improvement	To meet the 1995 demand in the RPA Assessment, provide a 37 percent increase in sport fishing opportunities and increased opportunities for the commercial salmon fisheries by restoring degraded habitat and improving habitat. Also, maintain and enhance habitat for endangered and threatened species and provide for appreciative fish use at developed recreation sites and VIS.
Range	Grazing use (livestock)	Provide forage without impairing land productivity.
Timber	Programmed sales offered	Maintain or exceed the 1976 National Forest percentage share of the total domestic timber supply
	Reforestation	Eliminate the reforestation backlog by 1985. Treat all lands being cut over or deforested and maintain planned timber production on all other forested land in the National Forest System so as to prevent the development of future backlogs.
	Timber stand improvement	Accelerate stand examinations to have a minimum of 3-year projects (1,200,000 acres) with complete examination, prescription, and evaluation planned in detail. Accelerate growth potential necessary to meet long-term harvest levels.
Water	Water meeting quality goals	All water will meet or exceed minimum quality goals by the year 2000
	Water yield	Maintain current total water yield in all areas and selectively improve yields in water scarce areas by 170,000 acre feet.
	Favorable watershed	Allow no further decline in watershed conditions and by 2000, treat all lands declining in watershed condition to return them to near natural condition.
Minerals	Minerals leases and permits	To make available to the national economy the extensive mineral and energy wealth under NFS lands. To protect the surface resources during mineral operations and to require adequate reclamation when operations are concluded.

In response to these directions, four adjustments were made to the Regional Foresters' proposals by the Chief's staff.

(1) Wilderness. The acreage of wilderness in Region 10 was increased to concur with acreage included in the RARE II proposal.

(2) Range. The alternative program direction proposed for Region 2 showed costs too low and thereby distorted the present net worth of the program. The alternative selected did not meet Bankhead-Jones objectives (requirements to practice conservation and economic enhancement on National Grasslands and Land Use categories of lands) and failed to reflect linkages with the selected wildlife program. An increase in animal unit month (AUMs) outputs was made to the Region's proposal which increased the range program for the Region. An adjustment was also made in Region 8's alternative to show a slightly increasing trend in AUMs to reflect projections contained in the Assessment. It was recognized that these increases reduced the present net worth of the total range program. However, the increases were in line with the overall evaluation criteria for promoting local social benefits.

(3) Timber. The Regional Foresters' proposals would have provided 11.9 billion board feet of timber sale offerings in 1981, 12.2 billion in 1985, 13.2 billion in 1995, and 15.9 billion (subsequently projected) in 2025. Under this program the National Forest share of total domestic timber supply would decline. Direction was given to examine increases in National Forest harvests toward the goal of maintaining the National Forest share of total domestic supply.

(4) Facilities. Considerable analyses related to the facilities element (see appendix D). Alternative programs proposed by the Regions were not changed. However, on the basis of the evaluation, costs were increased in all Regions except Region 10, to provide for facilities needed to support all resources programs. These increases include provisions to meet responsibilities for dam safety inspection and correction of identified dam deficiencies. Region 10's original costs were acceptable.

In addition to the wilderness, range, timber, and facilities adjustments, other needs for continued evaluation during the formulation of the final Recommended Program were identified:

- A major concern was the relationship of National Forest System programs to State and Private Forestry program initiatives. There was a continuing need to coordinate resource programs on National Forest System lands with those on private lands, to prevent unnecessary duplication and to ensure that programs were complementary.
- Acre-equivalents were determined to be unsatisfactory units for measuring outputs of anadromous fish. A more appropriate unit of measure (thousands of pounds) was subsequently adopted.
- It was recognized that the relationship of support activities to resource programs had been potentially altered by developing a mix of alternative program directions, by element, to achieve a trial program. A close examination of the support needs was necessary and required continual monitoring throughout the development process.

The adjusted Program would emphasize management of National Forest System

lands to increase timber supplies and provide for an increased supply of outdoor recreational opportunities. Wildlife and fish programs would increase, commensurate with the timber and recreation programs, but forage production would increase at a slower rate. Emphasis would be placed on minerals management in response to the Nation's need for energy sources. All water quality improvement goals would be met by the year 2000.

Trial Program No. 2 is presented in terms of a base level and two increment levels, which build on the base to comprise a total program for the element. Base levels were essentially stewardship levels with declining outputs. Level No. 1 was constrained by a historic annual 4.2 percent real total growth through 1985. Thereafter it was constrained to 5.7 percent per year until it achieved the output levels described in Trial Program 1. Level No. 2 accelerates capital investments and raises the quality of experience for forest visitors and slightly increases timber supplies.

Recreation

Base Level.--The base portion of this program would accommodate a gradually decreasing number of forest visitors each year at current levels of service and quality of experience, declining from 210 million visitor days in 1981 to 198 million in 1985, and to 185 million in 1995. Unit costs for operation and maintenance would increase. Recreational opportunities accessible to urban populations would be increasingly difficult to provide. The present number of recreation fee sites (1,800) would be reduced to 900 because required services could not be provided.

Level No. 1.--An increase above the base level program to:

- Reverse the present trend of deteriorating facilities which gradually become unsafe and otherwise unusable. It would provide for compliance with legislative mandates such as the Safe Drinking Water Act and the Clean Water Act at existing levels. The present number of recreation fee sites could be increased to 2,000 by 1995.
- Provide improved recreational opportunities for urban populations without the necessity of large investments, through an expanded interpretive program and distribution of use. Users would be directed from over-utilized sites to areas where use could be accommodated. Mass transportation would be promoted. This would contribute to energy efficiency.
- Allow for protection of archeological and historically significant resources which otherwise would be lost or destroyed.
- Increase, extend, and improve access to National Forest areas through right-of-way acquisition, construction, and improvement of roads and trails.

Level No. 2.--An additional increase to:

- Convert approximately 50 million RVD's of use to more energy-efficient locations with respect to population (develop facilities more accessible to urban areas) wherein recreationists would realize approximately a 30-percent reduction in their energy consumption in pursuit of National Forest recreation.

Wilderness

Base level.--This program level would result in reduced wilderness management, protection, and service standards.

Level No. 1.--An increase above the base program to provide for the following:

- Continue present levels of management and protection of the wilderness resource while accommodating projected use.
- Improve coordination with other activities in wilderness, including mining and domestic grazing, while protecting the wilderness resource.
- Completion of management plans to assure continued protection of the wilderness resource.
- Establish a permit system to help disperse and limit use to appropriate carrying capacities.

Level No. 2.--An increase to accelerate and improve the standards of the above goals.

Wildlife and Fish

Base level.--Wildlife and fish habitat would decline overall from present levels. Wildlife improvements would decline from 2.3 million acre-equivalents in 1978 to 1.6 in 2025. Fish habitat improvement work would increase from 6,600 acre-equivalents in 1978 to 14,300 in 2025. It would provide minimum protection of endangered, threatened, and sensitive species.

Level No. 1. This would provide for:

- A modest increase in the improvement of anadromous fish habitat.
- Maintenance and a slight increase of species commonly hunted, fished, and trapped.
- Better habitat protection standards to provide for habitat diversity.

Level No. 2.--This would provide an expanded wildlife and fisheries program consistent with the majority of public comments supporting expansion. Costs and outputs would be between Alternative Program Directions 1 and 3 (see chapter 3). Sixty-eight percent of the cooperative plans developed with the States in response to the Sikes Act (P.L. 93-452) for 1981 would be implemented.

Range

Base level.--Livestock grazing in the National Forest System would decrease from the present levels. New capital investments would be essentially discontinued. Extensive grazing of native forage species would be utilized to meet use needs on suitable sites. Existing intensive grazing systems such as rest-rotation, would be discontinued as the improvements deteriorated through lack of adequate maintenance.

Level No. 1.--This would provide for a moderately increasing investment program with positive benefits from highly productive rangelands. Capital investments would proceed at a slow pace.

Level No. 2.--This would provide additional increases toward national goals for improved efficiency, community stability, resource protection, and wildlife and water quality.

Timber

Base level.--This program consists of a combination of regional alternatives which maximize the present net worth of the timber management program, subject to the constraint that each Region include a minimum level program (Alternative Program Direction 2) to help sustain existing mill capacities and employment at a reasonable level. National Forest sales offerings would decrease from 10.4 billion board feet in 1981 to 9.4 in 1995. Under this program the National Forest share of the total domestic timber supply would steadily decrease. Emphasis on increased output would be limited to the South. Output on the West Coast would remain relatively constant.

Level No. 1.--This increment would increase timber sale offerings over the base program. Regions 3, 6, and 8 would be at Alternative Program Direction 1. Timber sale offerings within the Rocky Mountain regions would be increased. Region 5 would have a slowly growing program and emphasize other resource values. Timber sales offerings would increase from 11.7 billion board feet in 1981 to 13.7 in 1995. The National Forest share of total domestic timber supply would decline slightly, while the share of domestic softwood supply would increase slightly over the period.

Level No. 2.--This increment would raise all Regions to Alternative Program Direction 1. Timber sales offerings would increase from 11.8 billion board feet in 1981 to 13.8 in 1995.

Water

Base level.--Clean water goals would be met for swimming and fishing, although total water yield would not meet water quality goals by the year 2000. This is because the watershed improvement program would be too small to treat all areas which are in a declining watershed condition. Other resource programs require a larger inventory and monitoring program for resource management than would be provided at this level.

Level No. 1.--The watershed improvement program would be adequate to meet minimum water quality goals by the year 2000. The program would meet inventory and monitoring needs after 1985.

Level No. 2.--This would meet all water quality goals by the year 2000, and selected water supply and fisheries areas would be improved to higher quality standards than level 1 by the year 2000.

Minerals

Base level.--This level would provide for the smallest amount of management effort and assistance toward the development of mineral resources. Increased energy demand would create a backlog of unprocessed lease applications. At this level, the Forest Service would be able to respond to approximately 11,250 leases, permits, and operating plans in 1981, 17,570 in 1985, and 23,230 in 1995.

Level No. 1.--At this level, Forest Service capacity to respond promptly to development proposals, in terms of the number of approvals of leases, permits, and operating plans, would rise by 12 percent over the base level in 1981, by 25 percent in 1985, and by 61 percent in 1995.

Level No. 2.--At this level, Forest Service capacity to respond promptly to development proposals, in terms of the number of approvals of leases, permits, and operating plans, would rise by 28 percent over the base level in 1981, by 77 percent in 1985, and by 100 percent in 1995.

Protection

Base level.--This minimum base level provides for treatment of one-third as many acres of fuels in 1981 as were treated in 1978. Annual outputs of acres treated would increase and then decrease as follows: 111,000 acres in 1981, 203,000 in 1985, and 152,000 in 1995.

Level No. 1.--This would provide for 103,000 additional acres of fuel treatment in 1981 with a steady increase in acres treated in future years as follows: 214,000 total acres treated in 1981, 277,000 in 1985, and 382,000 in 1995.

Level No. 2.--This would provide for 93,000 additional acres of fuel treatment with a slight increase in 1985 outputs followed by a drop in 1995 as follows: 307,000 total acres treated in 1981, 353,300 in 1985, and 287,600 in 1995.

Lands

Base level.--This minimum base level would carry out minimum land stewardship responsibilities in support of resource programs. The first round of land and resource management plans would be completed for all lands within the National Forest System by the mandatory October 1985 completion date. Only mandatory requirements for planning and special studies would be done. The intensity of planning would be consistent with the needs of a low level resource resource development program. Landline location, marking, and land status

would support a low level of resource output, and help resolve current trespass problems. The landline location backlog of 114,000 miles would be eliminated by the year 2000. Title claims activity would be minimal. Land purchases using Land and Water Conservation Funds would be at a high level until the program ends in 1989. Purchases using regular (Weeks Act) funding would acquire only the most critical parcels. Land exchange and adjustments would resolve other problems.

The special land use program would be primarily for those cases externally imposed. Needs for special use permits would increase as a result of increases in the national economy. Efforts would be made to accommodate and manage only the most important uses. Existing uses would be managed to protect the public interest.

Level No. 1.--This would provide for:

- Moderately intensified and accelerated land and resource management planning, and related special studies, to complete plans before the mandatory 1985 date.
- Moderately increased landline location, marking, and land status programs to support a moderate level resource output and resolve current trespass problems.
- Processing a moderately increased level of title claims.
- A moderate increase in land acquisition, using regular (Weeks Act) funding, to acquire lands needed to improve the manageability of eastern National Forests. Increase land exchanges and adjustment to a moderate level to improve landownership patterns. Increase rights-of-way acquisition to provide better access to National Forest System lands.
- The administration of special uses of National Forest System lands to accommodate all reasonable requests for special uses, to protect the public interest. Increased need for special uses is expected, especially in energy development by Federal and non-Federal parties.

Level No. 2.--This would provide for a further acceleration of all activities presented in Level No. 1.

Soil

Base level.--This level would maintain current soil productivity with gains in some areas being offset by losses elsewhere. It would provide for treating only the seriously declining soil areas. Inventory and monitoring activities would be insufficient to fully support some other resource management objectives.

Level No. 1.--This would provide for treatment of most areas with deteriorating soil conditions although the level of treatment would not be adequate until 1985. Inventory and monitoring activities would increase to that needed by 1985.

Level No. 2.--This would provide for increased soil productivity on selected timber and range forage sites prior to the year 2000. Timber sites would be improved through fertilization but physical modification (ripping) would be used to improve range sites. Inventory and monitoring and watershed improvement would be adequate to meet project planning needs for timber, recreation, range, fish, and wildlife.

Facilities

Base level.--This would provide minimum administrative facilities (including roads) basic to National Forest System land management, and essential to the service and distribution of users, and transportation of products. It would meet basic legal requirements for health, safety, and welfare, and environmental protection for declining resource programs (stewardship). At this level, many facilities would have to be closed or their uses limited.

Level No. 1.--This program would increase the construction, reconstruction and maintenance of facilities. The increase would facilitate more intensive resource use in recreation, wildlife, fisheries, range, timber and watersheds.

Level No. 2.--This program would:

- Meet Occupational Safety and Health Administration standards on an accelerated basis without closing or limiting use.
- Meet requirements for energy retrofit.
- Provide for cost-effective replacement of buildings based on value engineering concepts.
- Ensure a program in dam safety for all water impoundments regardless of hazard rating.

Selected outputs, activities, and costs are summarized for trial Program No. 2 for the National Forest System Program in table 5.6 at the end of this section.

Trial Program No. 2 for the National Forest System was evaluated for environmental effects. The evaluation presented below, covers the total trial program (base level through Level No. 2).

Economic Evaluation

The present net worth for the total National Forest System and its programs over 50 years is \$46.6 billion discounted at 7-1/8 percent. Table 5.5 shows present net worth by resource element. 3/

3/ See appendix C (Economic Analyses) for details of procedures used.

The Pacific Coast Regions (Regions 5 and 6) account for almost all the national present net worth associated with the National Forest System timber element. Regions 1, 2, 3, and 4 of the Rocky Mountains, the Northern Region (Region 9), and Alaska (Region 10) have negative values and reduce the total present net worth.

All Regions have positive values in the recreation, wildlife and fish, and water resource elements where costs are relatively low compared to total benefits. The Pacific Southwest (Region 5) and Region 2 of the Rocky Mountains contribute over 68 percent of the wilderness resource element values.

For the minerals resource element, the southern portion of the Rocky Mountains (Regions 2, 3, and 4) contribute over 69 percent of the present net worth. The large benefits in these Regions are due to energy related minerals.

Table 5.5.--NFS present net worth under the Trial Program No. 2 discounted at 7-1/8 percent by resource element and region

(Million dollars)

Resource element 1/	NFS regions									Total by element
	1	2	3	4	5	6	8	9	10	
Recreation	141	1,128	479	763	2,878	537	1,632	840	226	8,624
Wilderness	128	564	78	208	980	72	-14	245	-6	2,255
Wildlife and fish	274	791	416	511	168	518	298	300	305	3,581
Range	35	66	-5	-61	-9	-11	3	-12	N/A	6
Timber	-315	-657	-97	-291	3,588	13,870	569	-675	-635	15,357
Water	4,163	1,284	98	1,716	1,151	1,393	254	32	1,339	11,430
Minerals 2/	574	1,581	702	1,431	2	-75	137	429	608	5,389
Total by region	5,000	4,757	1,671	4,277	8,758	16,304	2,879	1,159	1,837	46,642

1/ Support costs are prorated among resource elements.

2/ Since value for locatable materials other than uranium and thorium was not determined, present net worth for minerals is underestimated particularly in Region 5.

Physical-Biological Evaluation

Water quality.--Water quality goals set forth in the Clean Water Act 4/ will be met under this program. This is a generally increasing program that provides for water resource inventory, monitoring, improvements, and land management planning information commensurate with the increase in land-disturbing activities. The program contains water yield increase activities in Regions 2, 3, 4, and 5, and represents all of the Regions' recommended program levels for water and the associated support elements. Water quality would be improved in both the short- and long-term.

Air Quality.--Short-term emissions from management activities would be at approximately the Alternative Program Direction 3 level (see chapter 4). There would be long-term reductions in gross emissions, and all applicable ambient air quality standards would be met.

Air quality in terms of ambient air on National Forest System lands is considered in three categories:

- The area meeting national ambient air quality standards would increase by 16,279,000 acres from the present 73,158,000 acres.
- The area significantly exceeding national ambient air quality standards would essentially be maintained at the present 98,155,000 acres.
- The area below national ambient air quality standards would decrease from the present 15,587,000 acres to zero.

Visual quality.--Program activities would generally affect the visual resource by intensifying landscape-impacting, and commodity producing activities. The program provides for mitigating such impacts and significant acreage would be protected from all adverse visual impacts.

Visual quality objective classes would change as follows:

- Preservation would increase 10,528,000 acres from the present 28,248,000 acres.
- Retention would decrease 13,006,000 acres from the present 37,141,000 acres.
- Partial retention would decrease 9,030,000 acres from the present 50,803,000 acres.
- Modification would increase 5,222,000 acres from the present 48,435,000 acres.
- Maximum modification would increase 6,286,000 acres from the present 22,222,000 acres.

4/ 91 Stat. 1566; 33 U.S.C. 1251.

Cultural resource.--Cultural resources and public information would be enhanced at significant sites, and opportunities to discover new information would be high. Substantially increased market orientation, especially in timber and minerals, would increase resource conflict and hence need for more mitigation effort. Increased activities of other resource uses would necessitate increased inventory and would expand knowledge of past human activities.

Vegetation.--The effects of this program upon vegetation would be a combination of the effects of Alternative Program Directions 1 and 3 (see chapter 4). On forested environments, the effects would be similar to the effects of Alternative Program Direction 1 but on rangeland they would be similar to the effects of Alternative Program Direction 3. In the West, shrub types on productive rangeland sites would be converted to either native or exotic grasses of high forage value. Genetically improved trees would be planted on cut-over, burned, or otherwise denuded forest sites.

Although the extensive planting activities on forests and rangelands would tend to reduce plant community diversity on specific sites, impacts would be offset by management to benefit a wide variety of wildlife, through timber stand improvement activities, and through improvement of deteriorated rangelands. Plant communities characteristic of early successional stages would be favored on rangelands.

Physical-biological productivity of both forests and rangelands would increase throughout the long-term planning period by cultural management activities.

Wildlife and fish.--Among the 18 management indicator species in the endangered and threatened species category, populations of 13 would increase, and those of 5 would remain unchanged. For the remaining 41 management indicator species, populations of 28 would increase, 7 would remain unchanged, and 6 would decrease. Those species with a downward trend require a climax vegetation, and the planned harvest of old growth timber would reduce these populations. (See chapter 4, Environmental Effects section.)

Social Evaluation 5/

Two kinds of social impacts are anticipated. The first is general for the population as a whole and the second specific to nonmetropolitan counties dependent on Forest Service programs.

The trial program is viewed as having a generally stabilizing effect on the economy and on timber-dependent communities. The moderate increases in timber harvesting from National Forest System lands and gradual shift to private holdings should not produce sudden disruption to most communities. Some regions are unable to increase their National Forest System timber harvest, but do plan to continue present levels. Others will be able to increase their harvest levels. The overall effect should be to increase economic, population, employment, taxation, and community stability in timber-dependent areas.

5/ Unpublished interdisciplinary team analysis and report on file with USDA Forest Service, Washington, D.C.

For the most part, the trial program is seen as socially beneficial. Negative impacts from boom conditions associated with some mineral development, from local reductions in timber harvesting, and even from overcrowded recreation areas tend to be specific for and limited to the community in the immediate area of such changes.

The impacts will be greater in the localities that are most dependent on Forest Service programs for their economic and social viability. These communities are generally rural and frequently lack economic diversity. As a consequence, some social impacts may be quite severe. The following impacts are anticipated in many Regions; however, it is important to keep in mind that the amounts of outdoor recreation, timber, and other resources, are quite different from region to region.

Recreational development impacts may be heavy for particular access-point or service area communities. The effects described above are significant in many counties near National Forests and will increase with further development. Even stronger impacts are experienced in communities that become major centers for a particular recreation provision such as the base community serving a new ski development. A Forest Service permit issued for a ski development may completely transform a community. Increases in income, tax base, and employment must be balanced against the infusion of different and often conflicting cultures, increases in housing costs, recreation-area crowding, and other changes. The net result varies for each community and for various groups within the community.

The trial program provides for a reduction in acres grazed by domestic livestock; however, it would support the community context of several sparsely populated areas. Ranchers, including some Native Americans, are frequently dependent on NFS grazing use. Some shifts in range use will occur as inefficient rangelands are allocated to more stable and efficient use.

The expanded wilderness areas would increase opportunities for certain kinds of leisure. As use grows, the quality of experience will be maintained by management of such use by controlling numbers and by dispersion. In some cases, the expressed value conflict between timber-dependent local and regional or national environmental interests may become an important political issue in State, local, and national politics.

There will be commercial benefits in some areas (mostly in Alaska), especially with anadromous fishing. Where Native Americans hold fishing rights, conflicts with other commercial and sport fishermen may be reduced by increased supply.

Mineral leasing expansion will benefit most Americans. Positive benefits include increased numbers of jobs, increased local and national income, and reduced reliance on imported minerals--some strategic in importance. Social impacts on a local scale may, in some cases, outweigh economic benefits. Negative benefits include rapid expansion of local economies and creation of "boom town" living conditions. In some cases, management of the timing and scale of mining operations can affect the economic efficiency of the operation.

State and Private Forestry Direction and Evaluation

A significant change was made in the protection element. Region 2 and the Southeastern Area recommended Alternative 4 while the other units recommended Alternative 3. Alternative Program Direction 4 was the only level of program on which southern State Foresters could achieve a consensus, and consensus was one of the main criteria. While the Alternative 4 program would be locally desirable, it was judged to be too costly for inclusion in the national Program. Therefore, the protection element was adjusted to Alternative 3 for all units.

State and Private Forestry programs would emphasize increases in technical and financial assistance for both market and nonmarket objectives. Assistance from the Federal Government to State agencies would be expanded in an effort to increase the volume of timber produced and the efficiency of wood utilization on State and private forest lands. Increased financial and technical assistance through State forestry agencies is designed to minimize negative physical-biological and social effects on State and private lands, by influencing landowners to consider and provide for protection and management of all resources on their lands. This would provide benefits across the entire program spectrum.

The program includes an accelerated southern pine reforestation program in response to the need identified in the Assessment. The Federal Government would provide much more financial and technical assistance for reforestation in the South where failure to regenerate pine after harvest is estimated to have severe impacts on long-term timber supplies.

Adjustments were also made in the rural fire prevention and control program in order to be consistent with the Administration's policies regarding the Federal role.

Selected outputs, activities, and costs are summarized for Trial Program No. 2 for State and Private Forestry programs in table 5.7 at the end of this section.

Research Direction and Evaluation

The research program proposed at the Portland meeting was judged by the Research staff to be responsive to needs identified in the Assessment by land and resource managers, and by representatives of users at Regional and national workshops. The program had been carefully coordinated with the forestry schools and other performers of forestry research and with special needs identified by resource professionals. It was responsive to national needs in energy, increased timber supply, environmental considerations, and increased productivity. It also provided for initiatives identified by the respondents' comments.

The program proposal provided for special Research initiatives developed since the 1975 RPA Program to meet newly emerging needs and current Regional problems, such as energy conservation and improved timber supplies.

Development of the Research program began at Alternative 2, utilizing the final four decision criteria accepted for the Research program, and the

professional judgments of research managers. The proposed Forest Service Research program would:

- Address most of the research needs identified by a joint task force of the U.S. Department of Agriculture and National Association of State Universities and Land Grant Colleges at a national research planning workshop in 1978, and the highest priority problems identified at the four regional workshops.
- Be responsive to calls by the President, congressional oversight committees, and experts on science policy for research to increase national productivity.
- Respond to needs expressed by resource managers for special technology.
- Undertake limited programs in basic research and international forestry.

The proposed program included existing programs and additions up to Alternative 3, plus partial funding for the special research initiatives, basic research, and international forestry. The special research initiatives, which address high priority research needs that would not be adequately met with present program levels, were developed during the past 4 years (that is, since 1976). They would provide knowledge and technology to improve productivity, and protect environmental values. Examples include research to:

- Increase and extend timber supplies, such as hardwood substitution for softwoods.
- Utilize wood residues.
- Improve regeneration.
- Develop integrated pest management methods and strategies.
- Develop use of wood and wood residues for energy.
- Develop methods to protect and restore environmental values, such as water quality and resource areas damaged or disturbed by surface mining.
- Increase nonmarket benefits in conjunction with increased harvest of timber and other marketable goods.

The Portland proposal called for significant short-term increases in funding which were unlikely because of potential budget constraints. The decision was made to reduce the Research program to current funding levels in 1981 and to phase in the new initiatives.

Details of the research program by element are presented in the following sections:

Recreation and Wilderness

Research would produce innovations to help: (1) meet increasing demands for all forms of recreation on forest and rangelands with a limited land base;

(2) increase the quality of dispersed recreation experiences; and (3) integrate recreation production with production of other benefits.

Wildlife and Fish

The program would provide information on the impacts of alternative land uses on consumptive and nonconsumptive fish and wildlife populations, and on habitats and the technology needed to enhance population numbers. Information would also be developed for the maintenance and improvement of habitat for endangered and threatened animals.

Range

New knowledge would be developed for the management of forest rangelands, with emphasis on improving revegetation effectiveness, restoration of range ecosystems, enhancement of productivity, and integration of livestock and forage production with other range resource benefits such as timber and wildlife habitat production, water yield, and recreational use. Strategies would be provided to arrest the desertification of arid and semi-arid lands.

Timber Management

Research in the timber area would lead to improved and new technology for expanding the long-term timber supply by adding to and improving knowledge for accelerating forest regeneration, improving stand stocking, and lowering costs of forest management operations. Special emphasis would be placed on those forested areas identified as suitable for intensive forest management. In addition, limited research would be directed toward hardwood substitution for softwoods and increased utilization of wood and wood residues.

Water

The program would add to and improve the knowledge necessary to improve the quality, quantity, and timing of water yield from forest and rangeland watersheds. Guidelines would be established to minimize nonpoint-source water pollution resulting from various forest and rangeland uses and practices; and the effects of acid precipitation and atmospheric deposition on forest ecosystems would be evaluated.

Minerals

Forest Service Research has long provided leadership in mineland reclamation beginning with the development of successful coal strip-mine reclamation techniques in the Central and Eastern coal fields. Beginning in 1975, the SEAM (Surface Environment and Mining) program was initiated with emphasis in the West. SEAM has been successful; but with developments such as widespread coal, phosphate, and copper mining in the East, and oil shale in the West, continuing research is needed.

Research on the rehabilitation of disturbed lands would determine and evaluate the effects of surface mining activities on the forest and range-

land resource for a wide range of conditions. New methods would be developed to prevent or alleviate the adverse impacts of land disturbance, and restore previously disturbed lands to full productivity.

Human and Community Development

Trees in the city are increasingly recognized as a vital asset in upgrading the quality of the urban environment. Open spaces, greenbelts, buffer strips, roadsides, community parks, wooded residential and industrial zones, expanding urban areas and new communities are areas of forestry concern. The potential benefits from technology-based management of urban forest resources are many: energy conservation, pleasant and serene environments, increased natural beauty, shade, recreational opportunities, cleaner air, less street noise, shelter from winds, and more birds and wildlife. But the impacts of urban activities and people on urban forests and the impacts of those forests on people are complex, dynamic, and poorly understood.

Plans for research include studies to develop efficient management systems that maximize benefits from urban trees.

Protection

This research would provide knowledge and technology to: (1) define, measure, and evaluate the ecological and socioeconomic impacts of destructive insects and disease-causing organisms on all forest resources and on wood in storage and use; (2) detect, assess, and predict changes in distribution and abundance of organisms and their impacts; (3) and reduce or maintain their numbers and damage at tolerable levels through control techniques and management strategies that are ecologically sound, economical, and environmentally acceptable.

New scientific knowledge and technology would be produced, leading to improved systems and strategies for smoke management and cost-effective integrated prevention and control of fire on State, private, and Federal lands. Information would strengthen the use of fire as a tool for protection and enhancing resource output. Overall, new skills would be developed through research to intensify total resource protection with emphasis on management.

Lands

Research plans include studies to develop and improve methodologies for: (1) identification of issues; (2) public involvement; (3) inventory and analysis of physical resources; (4) assessment of social, economic, and institutional factors; (5) consideration of policy and legislation; and (6) coordination with other planning efforts.

Field Review

Prior to completion of the process to develop Trial Program No. 2, a final meeting was held with Regional Foresters, Area Directors, and Station Directors to verify adjustments made for feasibility and to make further refinement before presentation of the program and alternative increments to Department of Agriculture policy officials.

The following tables summarize activities, outputs, and costs for the National Forest System and State and Private Forestry for Trial Program No. 2:

Table 5.6.--Projected National Forest System program outputs or activities, and total costs

Trial Program No. 2

Program element and output/activity	Unit of measure	Base year	Annual units		
		1978	1981	1985	1995
RECREATION					
Developed recreation use (Includes VIS)	Million recreation visitor days	79.6	84	102	122
Dispersed recreation use (Includes Wildlife & Fish)	Million recreation visitor days	130.2	140	165	196
WILDERNESS					
Wilderness management	Million acres	15.3	33.3	39.1	39.3
WILDLIFE & FISH					
Wildlife habitat improvement	Thousand acre-equivalents	2,333	4,206	5,690	6,004
RANGE					
Grazing use (livestock)	Million animal-unit months	9.9	10.1	10.4	11.0
TIMBER					
Programmed sales offered	Billion board feet	12.2	11.8	12.4	13.8
Reforestation	Thousand acres	411	440	528	425
Timber stand improvement	Thousand acres	420	414	460	430
WATER					
Water meeting quality goals or higher	Million acre-feet	370	410	420	420
MINERALS					
Minerals leases and permits	Operating Plans	14,500	18,565	25,656	30,435
HUMAN & COMMUNITY DEVELOPMENT					
Human resources programs	Thousand enrollee years	14.8	12	19	19

Table 5.6.--cont'd

Program element and output/activity	Unit of measure	Base year 1978	Annual units		
			1981	1985	1995
PROTECTION					
Fire management effectiveness index	Dollars/ thousand acres	1,111	1,190	1,260	1,230
Fuelbreaks & fuel treatment	Thousand acres	392	307	353	288
LANDS					
Land purchase and acquisition (excludes exchange)	Thousand acres	117	237	231	95
SOILS					
Soil & water resource improvement (improved watershed condition)	Thousand acres	4.2	77	46	25
FACILITIES					
Road construction/reconstruction (arterial, collector)	Miles	686	1,180	748	1,264
COSTS					
National Forest System - Washington Office	Million dollars	--	77.9	91.8	70.3
Total appropriated 1/	Million dollars	1,422	1,923.0	2,150.3	2,263.2
Allocated funds 2/	Million dollars	244	367.0	367.6	0
Total NFS	Million dollars	1,666	2,290.0	2,517.9	2,263.2

1/ NFS Appropriated Funds include all YCC, Cooperator, and NFS Washington Office funds.

2/ NFS Allocated Costs include YACC and other human resource programs, O&C Grants, Land and Water Conservation, and other funds. Costs exclude payments to State and Counties, and Federal Highway Funds.

Table 5.7.--Projected State and Private Forestry program
outputs, activities, and total costs

Trial Program No. 2

Program element and output/activity	Unit of measure	Base year	Annual units		
		1978	1981	1985	1995
Timber					
Reforestation (RFA, FIP, ACP)	Thousand acres	326	840	1220	1300
Timber stand improvement (RFA, FIP, ACP)	Thousand acres	275	640	740	1030
Timber prepared for harvest	Million cubic feet (MMCF)	225	330	385	545
Woodland owners assisted	Thousand owners	165	260	300	365
Improved utilization of wood	Million cubic feet (MMCF)	164	225	235	270
Human and community development					
Technical assistance for urban and community forestry	Thousand urban areas	2.8	3.5	5.5	7.2
Protection					
Insect & disease management surveys	Million acres	600	460	635	670
Fire loss on protected area	Thousand acres burned	1700 1/	1800	1720	1670
Water, minerals, lands, and soils					
State Forest Resource Planning	Million acres	N/A	185	165	165
Cooperative technical assistance for landowner forest management plans	Million acres	3.2	4.2	5.2	5.9
COSTS					
State and Private Forestry					
Total appropriated 2/	Million dollars	80	125	142	159
Allocated funds 3/	Million dollars	37	51	65	73
Total State and Private Forestry	Million dollars	117	176	207	232

1/ State and Private Forestry-Cooperative Fire Loss base figure is calendar year 1977.

2/ Projected estimates of funds appropriated to the Forest Service for cooperative forestry assistance under P.L. 95-313.

3/ Projected estimates of funds appropriated to other USDA agencies for programs which receive assistance from the Forest Service and State forestry agencies, including (1) forestry practices under the Agriculture Conservation Program and the Forestry Incentives Program funded through the Agricultural Stabilization and Conservation Service, (2) Rural community fire protection funded through the Farmers Home Administration, and (3) funds allocated to the Forest Service by the Soil Conservation Service for the forestry aspects of watershed planning, flood prevention, river basin surveys and investigations, and resource conservation and development.

FINAL DETERMINATION OF A PROGRAM

Throughout formulation of the Program, there were frequent Departmental discussions to: (1) determine the structure of the final decision process and criteria to be used; (2) obtain review and approval for the adequacy and acceptability of future price assumptions and unit costs for specific output-oriented activities in the program elements; (3) determine budget and work force constraints; and (4) determine policies (through resolution of issues) to be addressed by program choices. The result of such discussions provided decision makers with a high level of understanding of the concepts, data, and rationale which were the underlying components of the program analyses. Consistent with this understanding, the five basic as well as the identified variations and mixes of Alternative Program Directions were analyzed and evaluated. Using this information, revised program element increments were developed at the national level for Research and State and Private Forestry and at the Regional level for the National Forest System. These increments depicted the qualitative and quantitative difference between Alternative Program Direction elements and provided the final evaluation structure for the determination of the High Bound of the Recommended Program, 1980 update.

The increments were evaluated, element-by-element, along with their supporting rationale, costs, and consequences at a series of meetings which included Department policy officials, OMB officials, and Forest Service officials, with field office representation. Each resource element was reviewed and decided separately, and when all elements were decided their interrelationships were examined to assure that outputs were compatible in the environmental and operational context to assure total Program feasibility, compatibility, and effectiveness.

Beginning with Trial Program No. 1, economic analyses played a major role in the evaluation process. Economic efficiency and regional economic development effects of the program proposals were determined. Economic efficiency was evaluated by determining the present net worth of future benefits and costs. Regional economic development indicators were determined separately using input-output analysis.

Present net worth estimates for each program element and its increment were determined for the National Forest System. In addition, returns to the U.S. Treasury and payments to counties were calculated. (See Economic Analyses, appendix C).

Department policy officials decided upon which increments to include in the Program based on net present worth data, established policy commitments, public comments, decision on policy issues, the 1979 Assessment, projection of demand and supply, need to sustain community employment and other social benefits. These increments are described in the following sections of this chapter. These evaluations and the final review by the Department of each element were the basis for selection of the Secretary of Agriculture's Recommended Program presented in chapter 1.

National Forest System

Each resource element was described in terms of specific decision increments. The tables shown in the following section present the increments in terms of Alternative Program Directions. The preliminary Recommended Program mixes have been identified. They do not reflect final adjustments made in

determining the Program.

Recreation

Base.--The starting point for the recreation program element in each Region was Alternative Program Direction 2. In this Alternative, increased recreation use would be discouraged on National Forest lands and only services necessary to protect health and safety would be provided to the public. Basic resources would be protected under this program.

Recreation use could decline from the present 210 million recreation visitor days (RVD) to about 182 million by the year 1995. Total cost of the program would be \$210 million in 1995.

First increment.--This would increase activity to that specified in APD 5 in all Regions. Recreation use would rise by 88 million RVD to a total of 270 million RVD in 1995. Annual cost would increase by \$160 million to a total of \$372 million in 1995. This program would provide approximately the current share of projected recreation demand through 1995 (270 million RVD). The preponderance of public comment received indicated a desire for a much larger recreation program on National Forest lands.

The private sector would be encouraged to furnish recreational services and facilities on or near National Forests to offset declining developed sites availability within the National Forest System.

This increment is consistent with both policy issue decisions related to recreation: (1) it would increase recreation use fees, and (2) would make recreational opportunities more accessible to urban residents.

The increment would increase annual person-years of employment by approximately 98,000 in 1995. Much of this increased employment would take place in economically depressed areas.

Second increment.--This would increase activities to the APD 4 level (see chapter 4) in the Rocky Mountain, Pacific Southwest, and the Southern Regions. The program can be expanded in these Regions at less than \$2.00/RVD in areas near population centers.

This program increment would generate an additional 30,460 person-years of employment annually by 1995. The quality as well as quantity of public services would be increased in the above-mentioned Regions. Additional opportunities would be made available near population centers where this could be accomplished at an incremental cost of less than \$2.00/RVD.

This program increment is responsive to the public input from the three Regions that are moved to APD 4 and fits with the policy issue decisions (see chapter 1). Emphasis would be shifted from market to nonmarket outputs. However, the private sector would still be involved wherever profit opportunities exist.

Third increment.--This would increase activities in the Pacific Northwest, the Eastern, and the Alaska Regions. The increase in the Eastern Region would meet projected demand and make opportunities available near heavily populated areas. However, the incremental cost would be high (\$4.20/RVD). The incremental cost in the Pacific Northwest and Alaska Regions would be less than

\$1.20/RVD. In all, an additional 16 million RVD would be provided at a cost of \$32 million. An additional 7,200 person-years of employment would be generated annually under this program by 1995.

Fourth increment.--This would increase activities in the Northern, Southwestern, and Intermountain Regions. This is the highest increment considered for recreation; it is responsive to the public input received. An additional 16 million RVD or a total of 322 million would be provided by the year 1995 at a total cost of \$453 million. This means that the National Forests would increase their share of the projected recreation demand by about 60 million RVD. All Regions would provide a full level of services to the recreating public while fully protecting environmental resources.

The Alternative Program Directions which represent each incremental level are shown below by Region:

Recreation program proposals

Incremental program	Region									
	1	2	3	4	5	6	8	9	10	
Alternative program directions										
Base	2	2	2	2	2	2	2	2	2	
First	5	5	5	5	5	5	5	5	5	
Second	5	4	5	5	4	5	4	5	5	
Third*	5	4	5	5	4	4	4	4	4	
Fourth	3	4	4	4	4	4	4	4	4	

* Preliminary recommended recreation program mix: includes reductions in increments in order to start at a lower level (Alternative 5 for all Regions) and then phase into a higher level program by 1995.

Wilderness

Base.--All acres recommended for wilderness under RARE II (34.1 million acres) would be included by 1981. By 1995, 39.32 million acres would be managed as wilderness at a total cost of \$52.35 million. The actual increase in wilderness acreage and the choice of specific areas is subject to decisions by Congress. The unit cost would be less than \$1.00/acre in all Regions except the Pacific Southwest, Southern, and Eastern Regions (Regions 5, 8, and 9). High numbers of RVD's and the impact of intense use (permits, more rangers, etc.) increases the cost of managing Wilderness in the three latter Regions up to \$4.00/acre by 1995. In Alaska, the cost per acre would be 27 cents.

This program was developed through the RARE II process and meets the established criteria, including consideration of public input. Wilderness management would be limited to the minimum necessary to protect and perpetuate wilderness values in the Northern, Rocky Mountain, Southwest, Pacific Northwest, and Southern Regions. The program would provide for a substantial increase in wilderness use, reduction of conflict, protection of values, and

a greater opportunity for a variety of experiences in the Intermountain, Pacific Southwest, Eastern, and Alaska Regions.

First increment.--By 1995 1.75 million additional acres from the "further study" category of RARE II would be added to the Wilderness System. These acres are in the Northern and Southwestern (lowest unit cost), and Eastern (high demand) Regions. A higher level of management would be provided in the Northern and Southwestern Regions. A total of 41.07 million acres of National Forest Wilderness would be included under this program by 1995 at an annual cost of \$56.89 million.

Second increment.--By 1995, 2.51 million additional acres from the "further study" category of RARE II would be added to the Wilderness System. These acres are in the Northern, Rocky Mountain, and Pacific Northwest Regions (all lowest unit cost). A much higher level of management and protection would be provided in the Northern, Rocky Mountain, and Pacific Northwest Regions. In 1995 a total of 43.58 million acres of National Forest Wilderness would be provided at an annual cost of \$68.47 million. The cost per acre would increase from \$1.38 to \$1.57 per year. All Regions except the Southern would provide for a substantial increase in wilderness use, reduction of conflict, full protection of values, and a greater opportunity for a variety of experiences.

Third increment.--This increment would raise the level of management in the Southern Region to that in all other Regions.

The following tabulation summarize the wilderness increments by region:

Wilderness program proposals

Incremental program	Region								
	1	2	3	4	5	6	8	9	10
Alternative program direction									
Base	2	2	2	3	4	2	2	3	4
*First	3	2	3	3	4	2	2	4	4
Second	4	4	3	3	4	4	2	4	4
Third	4	4	3	3	4	3	4	4	4

* Preliminary recommended wilderness program mix.

Wildlife and Fish

Base.--The base proposal for the wildlife and fish program includes operation and maintenance of existing habitat improvements; coordination and administration of wildlife programs, both internal and external; and the activities necessary to meet the legal requirements of the Endangered Species Act. As such, it satisfies irreversible commitments. Increments were chosen by Region, to maximize present net worth.

First increment.--This would add habitat improvements for anadromous fish where analysis indicated efforts to increase production would benefit the present net worth of the National Forest System.

Second increment.--This would add programs for other fish, game, and non-game wildlife, as well as cooperative projects with States where available information indicated continued positive returns on investments.

Third increment.--This would add new wildlife and fish programs that the Forest Service and States agree to be of highest priority from a resource standpoint. This increment has a negative present net worth but would implement 55 percent of the cooperative plans for 1981, developed jointly with the State fish and wildlife agencies in response to the Sikes Act.

Fourth increment.--This would bring all habitat improvements to the same level as the base in each Region and has a negative present net worth. It is responsive to the policy direction calling for increased emphasis on wildlife and fisheries. Sixty-five percent of the cooperative plans for 1981 would be implemented.

The following tabulation summarizes only the fourth increment because the base and first three increments discussed above contain only selected portions of the wildlife and fish Alternative Program Directions.

Wildlife and fish program proposal

Incremental program	Region									
	1	2	3	4	5	6	8	9	10	
Alternative program direction										
*Fourth	5	1	4	4	3	3	3	3	1	

*Preliminary recommended wildlife and fish program mix.

Range

Base.--The base starting level for range is the combination of Regional alternatives that maximizes positive present net worth. It is not a feasible program, as Regions 4, 8, and 9 would not have a program based on that criterion. All Alternative Program Directions for the three latter Regions have negative present net worths. Output in livestock grazing animal unit months (AUM) would decline from 7.2 million AUM in 1981 to 6.5 million AUM by 1995. Also 2.7 million AUM would be dropped immediately to get to the 7.2 million level. This level would have serious impacts.

First increment.--This increase satisfies irreversible commitments and begins to respond to the policy statement which requires range programs to sustain social as well as economic benefits. Regions 4, 8, and 9 are included with minimum level programs. Outputs would decline with 9.8 million AUM in 1981 to 8.9 million AUM by 1995.

Second increment.--This continues livestock grazing on the National Forest System at present levels. Outputs would increase slightly, from 10.1 million AUM in 1981 to 10.2 million AUM in 1995.

Third increment.--This would increase range grazing to 10.7 AUM by 1995 to meet social, demonstration, and rural development objectives.

Fourth increment.--This would increase livestock grazing to help meet demands projected in the RPA 1979 Assessment. Outputs would increase from 10.1 million AUM in 1981 to 11.0 million AUM in 1995.

The range program is summarized below by increment and region:

Range program proposals

Incremental program	Region								
	1	2	3	4	5	6	8	9	10
Alternative program direction									
Base	4	2	2	0	2	2	0	0	N/A
First	4	2	2	4	2	2	2	4	N/A
*Second	5	5	3	5	5	5	5	4	N/A
Third	3	3	3	3	5	3	5	5	N/A
Fourth	3	3	3	3	3	3	5	3	N/A

* Preliminary recommended range program mix.

Timber

Base.--The starting point was the combination of regional alternatives that maximizes positive present net worth. Regions 2, 9, and 10 had negative present net worth programs for all five Alternatives.

First increment.--This was also a combination of Regional alternatives that maximizes present net worth. In addition, Regions 2, 9, and 10, which had negative present net worths, were assigned the Alternative with the lowest negative present net worth. This program provides a relatively constant annual harvest averaging 11.8 billion board feet through the 1990's and gradually increasing to 13.1 billion board feet by 2025. This program would lead to a steady decrease in the National Forest share of the total domestic timber supply.

Second increment.--This would increase annual sales offered to 12.3 billion board feet in 1985, to 13.3 billion board feet in 1995, and 16.1 billion board feet in 2025. Under this program, the National Forest share of total domestic timber supply declines from 16.6 percent in 1976 to 15.3 percent in 2025. The National Forest share of softwood would remain constant over the period. The program requires modification of Alternative 3 in Regions 1, 5, and 9 to delay timber harvest and road construction in the short term, but to accelerate these activities after 1985 in Regions 1 and 5 and after 1995 in Region 9. Alternative 5 is modified in Region 6 to increase harvest in the short term and maintain harvests in the long term about halfway between the original Alternative 5 and Alternative 3. This increment benefits consumers by \$4.9 billion through lower softwood product prices over the base program. Discounted benefits to processors are \$2.8 billion due to increased supply from the National Forests. Discounted revenue to other forest landowners falls by \$5.9 billion as a result of lower stumpage prices due to increased supply from the National Forests.

Third increment.--This would increase annual timber sales offered to 12.5 billion board feet in 1985, to 13.7 billion board feet in 1995, and 16.6 billion board feet in 2025. Under this program, the National Forest share of total domestic timber supply declines from 16.6 percent in 1976 to 15.8 percent in 2025. The National Forest share of softwood would increase slightly from 21 percent to 23 percent over the period. Present net worth is \$35.4 billion. In addition to the modifications to Alternatives in Regions 1 and 5, Alternative 1 in Region 6 was modified to raise intermediate production goals. Timber production goals in Region 9 were raised to Alternative 3. This increment benefits consumers by \$1.6 billion through lower softwood product prices over the first increment. Discounted benefits to processors are \$0.7 billion and discounted revenue to other groups of forest landowners falls by \$1.8 billion; and discounted revenue to other groups of forest landowners falls by \$1.8 billion as a result of lower stumpage prices due to increased supply from the National Forests.

Fourth increment.--This program would raise all Regions to Alternative Direction 1. The accelerated intermediate production goals of Alternative 1 are relaxed and increases in the Rocky Mountain Regions are emphasized. Annual timber sales offerings would reach 12.8 billion board feet by 1985, 14.4 billion board feet by 1995, and 17.9 billion board feet by 2025. The National Forests' share of softwood would increase from 21 percent to 24 percent over the period. Present net worth of this program is \$32.6 billion. This increment benefits consumers of softwood products by \$0.6 billion dollars over the second increment. Discounted benefits to woods processors are \$0.9 billion.

The timber program is summarized in the following tabulation:

Timber program proposals

Incremental program		Region								
		1	2	3	4	5	6	8	9	10
Base		4	0	3	4	3	5	3	0	0
First	*	4	4	2	4	3	5	3	2	5
Second	**	3A	4	5	5	3A	5A	1	5A	5
Third	***	3A	4	5	5	3A	1A	1	3	5
Fourth		1	1	1	1	1	1	1	1	1

"A" indicates modifications to the Alternative Program Direction.

* Alternatives differ from second trial program due to refined cost and price information.

** Preliminary recommended timber program mix, lower limit of range.

*** Preliminary recommended timber program mix, upper limit of range.

Water

The funds for water resource input to project planning and implementation of other resource activities, to offset adverse impacts on water supply and quality generated by other resource production, are programmed in the benefiting element. Collection of basic water resource data is programmed

in the water element. Due to the interrelation of the water element and the other resource elements, the required program level in the water element is directly related to program levels of other resource elements, particularly timber, range, minerals, wildlife, and fisheries.

Base.--This consists of Alternative 2 for each Region. It maximizes present net worth. The direct input to other resource activities would be funded in the benefiting element. Basic data collection, monitoring, and improvement activities would be reduced and continue to decline. Consequently, there could be a decline in water quality.

First increment.--This increase would add to the base sufficient water data collection, monitoring, and improvement activities to provide for a moderate resource program that would remain level throughout the analysis period. It reduces the present net worth. This program would provide for modest increase in water quality and maintain water quantity.

Second increment.--This increasing program provides water resource inventory, monitoring, land management planning, and improvement projects necessary to maintain water quality with an increasing commodity production program. This is the level of water program proposed by each of the Regions. This level will improve or offset adverse impacts on water from rising production activities in other resource areas and meet or exceed water quality goals.

The water program is shown below:

Water program proposals

Incremental program	Region									
	1	2	3	4	5	6	8	9	10	
Alternative program direction										
Base	2	2	2	2	2	2	2	2	2	
First	3	5	5	5	5	5	5	5	5	
Second *	3	4	3	3	3	1	3	3	1	

* Preliminary recommended water program mix.

Minerals

Base.--At this level, the program would increase activities to process applications for mineral permits and leases; approve operating plans, environmental studies, and reports; supervise mineral operations and reclamation work; and emphasize energy minerals production for Regions 1, 2, 3, 4, 8, 9, and 10. Region 6 would not have a program with a positive present net worth at the base level. Region 5 has a slightly decreasing program at the base level.

First increment.--This would provide a minerals program in Region 6. The program is needed to meet public demand for hardrock minerals; to meet the requirements of the national energy programs (i.e., geothermal program); and to meet gravel demands for timber road construction. Present net worth of the program is only slightly less than that of the base. The Region 6 program is

currently not cost effective because the majority of output is gravel and crushed rock for timber road construction on National Forest System lands. This material is used by road builders on National Forest System lands at no charge. When geothermal sources are developed, Region 6 will be cost effective.

Second increment.--This would increase mineral activity in Region 5 from a slightly decreasing program to one that responds to the public demand for geothermal development by processing lease applications. Again, the decrease in present net worth is slight. The following tabulation shows the minerals program:

Minerals program proposals

Incremental program	Region								
	1	2	3	4	5	6	8	9	10
Alternative program direction									
Base	1	1	1	1	2	0	1	1	3
First	1	1	1	1	2	3	1	1	3
Second *	1	1	1	1	3	3	1	1	3

* Preliminary recommended minerals program mix.

State and Private Forestry

Presentation of the S&PF portion of the Program at the request of Department of Agriculture policy officials included an overall assessment of the forestry situation, its implications for nonindustrial private forests, and an analysis of industry response and impact of the State and Private Forestry program proposal. The results of that assessment are summarized below:

Nonindustrial Private Forestry Situation

Seventy-two percent (approximately 347 million acres) of the total U.S. commercial forest land was privately owned in 1977. Much of this area is productive and close to markets for timber products. Consequently, these lands have long been a major source of timber for wood-using industries. Fifty-two percent of these forests are in the South, and most of the remainder are in the North.

The 1979 Assessment projects significant shifts in softwood sawtimber supplies among ownerships. The share from nonindustrial private forest lands is expected to increase from 29 percent in 1976 to 41 percent by 2030. The softwood timber harvest in the South is expected to double in response to rising stumpage prices. This increase in southern harvest is counted upon to offset expected declines in other parts of the country, particularly from private lands on the West Coast. If softwoods are adequately regenerated after these timber harvests in the South, the U.S. softwood supply would increase.

Lags in pine regeneration over the past 14 years, however, clearly indicate significant problems in continuing these higher softwood harvest rates.

Softwood regeneration rates have been declining markedly since the middle 1960's, when agricultural land abandonment was very sharply reduced and resurgence of natural pine stands on former agricultural lands virtually ceased. Hardwood regeneration rates have been increasing. These changes have been marked by continued increases in net annual growth and volume of pines that regenerated on retired cropland from 1945 to 1965. The decline on pine regeneration is basically on the nonindustrial private ownerships.

This regeneration problem was first cited in a Georgia study that compared 1961 and 1972 measurements of forest survey plots. The study showed that of the large acreage of southern pines harvested on nonindustrial private land between the two surveys, 11 percent showed evidence of replanting to pines, 21 percent naturally regenerated to pine, and 68 percent naturally converted to hardwoods.

Nonindustrial private owners control 63 percent of the area in pine types in the South. These owners must provide much of the wood for current and future pine harvests. However, during the 1956-1977 period, most of these owners showed little inclination to accelerate regeneration on their harvested pine lands. In contrast, forest industry investments by 1977 were 2 1/2 times the 1965 rate. This indicates that these industries view investments to establish pine stands as advantageous.

About half of the pine regeneration efforts that have occurred on nonindustrial private forest lands since 1965 have been encouraged and assisted through public cost-sharing programs (FIP, ACP, and a few State programs). Industry assistance in seedling production, and "at cost" site preparation and planting, consulting foresters efforts, technical assistance, and landowner initiatives also contributed to this regeneration effort as well as to that half that was done without cost share assistance.

The effects of the shortfall in pine regeneration is shown by the long-range projections in the 1979 Assessment. Largely as a result of this shortfall, net annual growth begins to decline after the year 2000. If high levels of harvesting are continued, the inventories of softwood growing stock will begin to decline significantly. Eventually, harvests must also decline unless investments in various management programs are significantly increased. Without expanded regeneration, prices in the latter part of the projection period and in the decades that follow are likely to rise more rapidly than indicated in the equilibrium projection.

Research conducted in support of the 1979 Assessment shows that there are numerous opportunities for investments in forest management that would yield favorable economic returns. If all these investments were made, long term timber supplies could be sustained and increased substantially. The study shows that there are economic opportunities for more intensive management on 168 million acres of commercial timberland in non-Federal ownership. With treatment of these acres, net annual timber growth could be increased by 12.7 billion cubic feet, a volume roughly equal to three-fifths of the total net annual growth in 1976. The bulk of opportunities are for softwoods on nonindustrial private lands in the South. Achieving these growth increments would require several decades. The effects of investments in these economic opportunities cannot be realized until trees grow to marketable size. Furthermore, substantial capital, \$13.3 billion, would be required over a 10 to 15-year period to do the job on all identified acres.

About three-fourths of the acres containing economic opportunities require reforestation or conversion of existing stands. Needed treatments include regeneration of nonstocked acres, harvesting mature stands and regeneration of the tract, and conversion of existing stands to more desired species. Reforestation and conversion represent about 90 percent of the investment opportunities.

The 1974 Forestry Incentives Program (FIP) resulted in treatment of 257,000 acres, 0.1 percent of the nonindustrial private commercial timberland. Analysis indicates that those treatments should result in a first-rotation softwood yield increase of 1 billion cubic feet. That is 28 percent of the 1976 softwood harvest from nonindustrial private ownerships.

Although recent studies have provided greater insight concerning investment opportunities on private forest lands and effectiveness on Federal assistance programs, more emphasis will be given in the next 2 years to economic analysis and justification for cooperative forestry programs. The level of technical assistance for forest management will be restrained until analytical assessments are completed.

Increments

All of the major program increments in the final consideration for State and Private Forestry reflect information and recommendations provided to the Regions and Areas by the States. Each program mix can be readily disaggregated to the Regions and Areas and subsequently to the States.

1. For State and Private Forestry, Alternative Program Direction 2 is considered to be the minimum program below which there could be no separate and distinct role of providing technical assistance, and there could be very little financial assistance to the States. In response to the President's direction provided through the 1980 budget proposal, the program contains no funds for Rural Fire Prevention and Control, Urban Forestry Assistance, and General Forestry Assistance (Pinchot Institute, FIRESCOPE, and Dutch elm disease).

2. The second increment is a variation of Trial Program No. 2. In consideration of incomplete analytical support for the effectiveness of technical assistance programs and plans to determine their economic effectiveness, this program begins at a significantly lower level of appropriated funds in 1981. It increases gradually between 1981 and 1985 to the level of Trial Program No. 2 except that the rural fire program remains much smaller. Allocations for such initiatives as the Forestry Incentives Program remain as they are in Trial Program No. 2.

3. The third increment is Trial Program No. 2. It is a mix of the original five Alternative Program Directions and is judged to be a realistic and achievable program. It would increase financial and technical assistance through State forestry agencies to support increased timber growth and harvest, and influence landowners to be more responsive to the need to manage and protect all forest resources on their land. This represents the preliminary recommendations for the S&PF Program.

Research

For Research, each increment is a research initiative that will produce new knowledge needed to accomplish a national or regional goal, such as

increasing timber supply and biomass for energy. Studies are conducted in six specific areas--forest environment, forest fire and atmospheric sciences, forest insects and diseases, forest products and engineering, forest resources and economics, and timber management--and one general area--international forestry. Because research outputs are difficult to predict and to measure, the Research program is displayed in terms of the input effort in each area in terms of scientist years.

Between 1970 and 1979 the number of scientist years (SY's) increased by less than 2 percent after actually declining in the mid 1970's. The distribution among the specific areas ranged from 25 percent in timber management to 8 percent in fire and atmospheric sciences. The other specific areas each had from 13 to 20 percent of the total. This mix remained relatively stable between the two time period. A 2-percent gain in environmental research was offset by declines in insect and disease research and forest products and engineering research.

Within the specific areas the changes were greater between the two time periods. Both insect and disease research and the forest products and engineering areas declined by 6 percent. The decline in the first area was early in the 1970's, whereas the utilization component declined at the end of the decade. Both the fire and forest resource-economics areas increased by 4 percent; however, economics research declined, whereas forest resource evaluation increased. Environment research, which represented one-fifth of the scientists in 1970, increased by 15 percent. This increase was largely in range, wildlife, and surface mineland reclamation research. However, significant budget reductions in these activities as well as in recreation during 1980 will offset this increase. International forestry, a small program, cuts across many of the specific areas remaining relatively unchanged.

Base.--The base level consists of Alternative Program Direction 2, which is currently in effect. In fiscal year 1979, this research was funded at \$111 million. Research was done on problems related to trees and timber management (17.7% of funds), forest products utilization (12.2%), forest engineering (2.1%), forest watersheds (8.7%), wildlife, fish, and range habitat (8.1%), forest recreation (3.0%), forest fire and atmospheric sciences (8.8%), forest insect and disease (19.3%), renewable resources evaluation (12.8%), renewable resources economics (4.5%), and rehabilitation of surface-mined land (2.9%).

Research is carried out by 979 scientists located in eight Experiment Stations and the Forest Products Laboratory. Projects, consisting of one or more scientists and supporting personnel, are established to do research on specific problems. An average of 11 percent of the base research program dollars are used to support research by university scientists on aspects of problems that cannot be adequately treated by available project scientists.

Current funding and available personnel are inadequate to support research on all high-priority problems. The program increments identified in the RPA process address these high-priority research needs. The new initiatives, grouped by increments that imply priorities, respond to needs identified through national and regional planning and to other expressed needs such as the President's environmental message of August 1979. These new initiatives will lead to innovations that enable action agencies to better meet the growing demands for goods and services from a fixed land base while maintaining or enhancing the quality of the environment. Preliminary recommendations are for

implementation of the base and the first, second, and fourth increments in 1981, with implementation of the third increment after 1982.

First increment.--This would add research initiatives in eastern hardwoods, softwood utilization, range and desertification, integrated pest management, and surface mine-land rehabilitation. The start-up costs for the base plus this increment approximate the 1981 budget proposal; program activities and costs increase over time. This increment relates directly to more efficient use of our timber resource and rehabilitation of surface-mined areas; much of it will support increased energy production.

Second increment.--This increment relates to environmental protection and enhancement as well as to mounting world forestry problems as outlined in the President's environmental message of August 1979. New initiatives would include anadromous fish, international forestry, riparian habitat, endangered and threatened species, basic research competitive grants, and urban and community forestry programs. Competitive grants would allow for expansion of basic research both within and outside the Forest Service.

Third increment.--This increment relates almost entirely to environmental protection. Included here are high-priority studies on systems for land management planning, fire and smoke management, nonpoint-source pollution, outdoor recreation, wildlife habitat management, and snow management.

Fourth increment.--This would add construction needs to the previous proposals.

Fifth increment.--This increment addresses all aspects of timber production with the objective of producing more fiber, with less loss from pest damage and more efficient utilization of all types of wood fiber including residues. It would add studies in multiresource evaluation, timber management, silviculture, genetics, accelerated pest management, harvesting systems, and products utilization. Implementation of this increment should begin in 1985.

Human Resource Programs

Program increments are presented in terms of outputs, costs, and effects.

A majority of the human resources programs are allocated to the Forest Service by the Department of Labor. Based on preliminary contacts with the Department of Labor, a base and three increment programs were developed to relate the human resources programs to other Forest Service activities. Based on mid-range economic projections, those Department of Labor funds tied to economic indicators were dropped from the recommendations after 1985 leaving only the Youth Conservation Corps and the Volunteers in National Forests in the Program after 1985.

The following tabulation summarizes the human resources programs:

Outputs/costs	Base	Program proposals increments		
		1	2	3
Principal output (thousands of enrollees)	20	28	36	54
Cost (million dollars)	30	45	60	90
Cost per enrollee (dollars)	1,500	1,607	1,667	1,667
Value of work (million dollars)	34.2	51.3	68.4	102.6

The program provides gainful summer employment for youths of all racial and economic backgrounds. Approximately 50 percent of the participants will be women. Of the total employment, it is projected approximately 11 percent will be Black, 6 percent Hispanic, 1 percent Native American, and 1 percent will be from other minority groups. Approximately one-third of the enrollees will be recruited from families whose annual income is \$10,000 or less.

The YCC program is not focused on chronically unemployed youth. Accomplishment of the objective of summer employment for disadvantaged youths is through direct employment (one-third of total enrollees) and secondary employment when other youths participate in the YCC program.

Final marginal adjustments were made to the Program as a result of overall evaluation.

Establishment of a Program Range

Department of Agriculture policy officials decided which increments to include in the Program by using results of present net worth analyses, established policy commitments, public comment, decisions on the policy issues, level of national demand, the need to sustain community economies and employment, social benefits, and environmental effects.

Following review, evaluation, and decision on the various incremental levels for the three broad program areas--National Forest System, State and Private Forestry, and Research--the overall rate of growth of the Program was reviewed. The program levels provided for an annual real rate of growth of 8.5 percent. These program levels were circulated for review by other Federal Departments with an interest in the Program and by Executive officials of the administration. Review comments strongly recommended that the short-term economic situation should be reflected in the final program determination, since it realistically influences the annual program planning and development. The Department concurred, but viewed the program levels in the review draft as a desirable set of goals given a favorable economic environment.

In order to effectively provide for both long-term needs and short-term economic factors, it was decided to present the Program as a range of resource

options. Decision criteria for the entire range were the same, except that budget constraints reflecting the near-term economic outlook became a limiting factor at the lower side of the range.

To clarify the scope of the Program, it was to be characterized by the two Bounds of the range. At the High Bound of the Program, activities would increase more rapidly to meet long-term needs. At the Low Bound, the budget would be held constant at the real 1981 budget level through 1985; after 1985 it, too, would rise in response to a more favorable economic outlook. In effect, some investments needed for long-term resource production would be deferred at the Low Bound level in order to respond to current and expected short-term economic conditions. (See the following table for the approximate mix of Alternative Program Directions which come closest to describing the Low Bound.)

Mix of Alternative Program Directions,
by Element--Low Bound - long-term (1995 and beyond)

		Region								
Element		1	2	3	4	5	6	8	9	10
Recreation	<u>6/</u>	5	3	5	5	5	5	5	5	5
Wilderness		2	5	2	3	5	5	5	3	3
Wildlife and fish	<u>6/</u>	5	5	5	5	5	5	5	5	5
Range	<u>6/</u>	5	5	3	5	5	5	5	5	5
Timber		5	4	5	5	5	5	5	5	1
Water	<u>6/</u>	3	5	5	5	3	5	1	2	2
Minerals		5	5	5	5	5	5	5	5	5

^{6/} Low Bound is more similar to Alternative 2 for the short term 1981-1985.

APPENDIXES



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APPENDIX A

cal and ecological base for effective management, use, and protection of the Nation's renewable resources;

(5) inasmuch as the majority of the Nation's forests and rangeland is under private, State, and local governmental management and the Nation's major capacity to produce goods and services is based on these nonfederally managed renewable resources, the Federal Government should be a catalyst to encourage and assist these owners in the efficient long-term use and improvement of these lands and their renewable resources consistent with the principles of sustained yield and multiple use;

(6) the Forest Service, by virtue of its statutory authority for management of the National Forest System, research and cooperative programs, and its role as an agency in the Department of Agriculture, has both a responsibility and an opportunity to be a leader in assuring that the Nation maintains a natural resource conservation posture that will meet the requirements of our people in perpetuity; and

(7) recycled timber product materials are as much a part of our renewable forest resources as are the trees from which they originally came, and in order to extend our timber and timber fiber resources and reduce pressures for timber production from Federal lands, the Forest Service should expand its research in the use of recycled and waste timber product materials, develop techniques for the substitution of these secondary materials for primary materials, and promote and encourage the use of recycled timber product materials. (16 U.S.C. 1600)

Sec. 3. Renewable Resource Assessment.—(a) In recognition of the vital importance of America's renewable resources of the forest, range, and other associated lands to the Nation's social and economic well-being, and of the necessity for a long term perspective in planning and undertaking related national renewable resource programs administered by the Forest Service, the Secretary of Agriculture shall prepare a Renewable Resource Assessment (hereinafter called the "Assessment"). The Assessment shall be prepared not later than December 31, 1975, and shall be updated during 1979 and each tenth year thereafter, and shall include but not be limited to—

(1) an analysis of present and anticipated uses, demand for, and supply of the renewable resources, with consideration of the international resource situation, and an emphasis of pertinent supply and demand and price relationship trends;

(2) an inventory, based on information developed by the Forest Service and other Federal agencies, of present and potential renewable resources, and an evaluation of opportunities for improving their yield of tangible and intangible goods and services, together with estimates of investment costs and direct and indirect returns to the Federal Government;

(3) a description of Forest Service programs and responsibilities in research, cooperative programs and management

Forest and Rangeland Renewable Resources Planning Act

- **Act of August 17, 1974 (88 Stat. 476, as amended; 16 U.S.C. 1600-1614)**

Sec. 1. This Act may be cited as the "Forest and Rangeland Renewable Resources Planning Act of 1974". (16 U.S.C. 1601 note)

Sec. 2. Findings.—The Congress finds that—

(1) the management of the Nation's renewable resources is highly complex and the uses, demand for, and supply of the various resources are subject to change over time;

(2) the public interest is served by the Forest Service, Department of Agriculture, in cooperation with other agencies, assessing the Nation's renewable resources, and developing and preparing a national renewable resource program, which is periodically reviewed and updated;

(3) to serve the national interest, the renewable resource program must be based on a comprehensive assessment of present and anticipated uses, demand for, and supply of renewable resources from the Nation's public and private forests and rangelands, through analysis of environmental and economic impacts, coordination of multiple use and sustained yield opportunities as provided in the Multiple-Use Sustained-Yield Act of 1960 (74 Stat. 215; 16 U.S.C. 528-531), and public participation in the development of the program;

(4) the new knowledge derived from coordinated public and private research programs will promote a sound techni-

of the National Forest System, their interrelationships, and the relationship of these programs and responsibilities to public and private activities; and

(4) a discussion of important policy considerations, laws, regulations, and other factors expected to influence and affect significantly the use, ownership, and management of forest, range, and other associated lands.

(b) To assure the availability of adequate data and scientific information needed for development of the Assessment, section 9 of the McSweeney-McNary Act of May 22, 1928 (45 Stat. 702, as amended, 16 U.S.C. 581h), is hereby amended to read as follows:

"The Secretary of Agriculture is hereby authorized and directed to make and keep current a comprehensive survey and analysis of the present and prospective conditions of and requirements for the renewable resources of the forest and range lands of the United States, its territories and possessions, and of the supplies of such renewable resources, including a determination of the present and potential productivity of the land, and of such other facts as may be necessary and useful in the determination of ways and means needed to balance the demand for and supply of these renewable resources, benefits and uses in meeting the needs of the people of the United States. The Secretary shall carry out the survey and analysis under such plans as he may determine to be fair and equitable, and cooperate with appropriate officials of each State, territory, or possession of the United States, and either through them or directly with private or other agencies. There is authorized to be appropriated not to exceed \$20,000,000 in any fiscal year to carry out the purposes of this section."

(c) The Secretary shall report in the 1979 and subsequent Assessments on:

(1) the additional fiber potential in the National Forest System including, but not restricted to, forest mortality, growth, salvage potential, potential increased forest products sales, economic constraints, alternate markets, contract considerations, and other multiple use considerations;

(2) the potential for increased utilization of forest and wood product wastes in the National Forest System and on other lands, and of urban wood wastes and wood product recycling, including recommendations to the Congress for actions which would lead to increased utilization of material now being wasted both in the forests and in manufactured products; and

(3) the milling and other wood fiber product fabrication facilities and their location in the United States, noting the public and private forested areas that supply such facilities, assessing the degree of utilization into product form of harvested trees by such facilities, and setting forth the technology appropriate to the facilities to improve utilization either individually or in aggregate units of harvested trees and to reduce wasted wood fibers. The Secretary shall set forth a program to encourage the adoption by these facilities of these technologies for improving wood fiber utilization.

(d) In developing the reports required under subsection (c) of this section, the Secretary shall provide opportunity for public involvement and shall consult with other interested governmental departments and agencies.

NOTE.—The National Forest Management Act of October 22, 1976, mistakenly added another subsection (d). This mistake is preserved in this text.

(d)(1) It is the policy of the Congress that all forested lands in the National Forest System shall be maintained in appropriate forest cover with species of trees, degree of stocking, rate of growth, and conditions of stand designed to secure the maximum benefits of multiple use sustained yield management in accordance with land management plans. Accordingly, the Secretary is directed to identify and report to the Congress annually at the time of submission of the President's budget together with the annual report provided for under section 8(c) of this Act, beginning with submission of the President's budget for fiscal year 1978, the amount and location by forests and States and by productivity class, where practicable, of all lands in the National Forest System where objectives of land management plans indicate the need to reforest areas that have been cut-over or otherwise denuded or deforested, and all lands with stands of trees that are not growing at their best potential rate of growth. All national forest lands treated from year to year shall be examined after the first and third growing seasons and certified by the Secretary in the report provided for under this subsection as to stocking rate, growth rate in relation to potential and other pertinent measures. Any lands not certified as satisfactory shall be returned to the backlog and scheduled for prompt treatment. The level and types of treatment shall be those which secure the most effective mix of multiple use benefits.

(2) Notwithstanding the provisions of section 9 of this Act, the Secretary shall annually for eight years following the enactment of this subsection, transmit to the Congress in the manner provided in this subsection an estimate of the sums necessary to be appropriated, in addition to the funds available from other sources, to replant and otherwise treat an acreage equal to the acreage to be cut over that year, plus a sufficient portion of the backlog of lands found to be in need of treatment to eliminate the backlog within the eight-year period. After such eight-year period, the Secretary shall transmit annually to the Congress an estimate of the sums necessary to replant and otherwise treat all lands being cut over and maintain planned timber production on all other forested lands in the National Forest System so as to prevent the development of a backlog of needed work larger than the needed work at the beginning of the fiscal year. The Secretary's estimate of sums necessary, in addition to the sums available under other authorities, for accomplishment of the reforestation and other treatment of National Forest System lands under this section shall be provided annually

for inclusion in the President's budget and shall also be transmitted to the Speaker of the House and the President of the Senate together with the annual report provided for under section 8(c) of this Act at the time of submission of the President's budget to the Congress beginning with the budget for fiscal year 1978. The sums estimated as necessary for reforestation and other treatment shall include moneys needed to secure seed, grow seedlings, prepare sites, plant trees, thin, remove deleterious growth and underbrush, build fence to exclude livestock and adverse wildlife from regeneration areas and otherwise establish and improve growing forests to secure planned production of trees and other multiple use values.

(3) Effective for the fiscal year beginning October 1, 1977, and each fiscal year thereafter, there is hereby authorized to be appropriated for the purpose of reforestation and treating lands in the National Forest System \$200,000,000 annually to meet requirements of this subsection (d). All sums appropriated for the purposes of this subsection shall be available until expended.

(e) The Secretary shall submit an annual report to the Congress on the amounts, types, and uses of herbicides and pesticides used in the National Forest System, including the beneficial or adverse effects of such uses. (16 U.S.C. 1601)

Sec. 4. Renewable Resource Program.—In order to provide for periodic review of programs for management and administration of the National Forest System, for research, for cooperative State and private Forest Service programs, and for conduct of other Forest Service activities in relation to the findings of the Assessment, the Secretary of Agriculture, utilizing information available to the Forest Service and other agencies within the Department of Agriculture, including data prepared pursuant to section 302 of the Rural Development Act of 1972, shall prepare and transmit to the President a recommended Renewable Resource Program (hereinafter called the "Program"). The Program transmitted to the President may include alternatives, and shall provide in appropriate detail for protection, management, and development of the National Forest System, including forest development roads and trails; for cooperative Forest Service programs; and for research. The Program shall be developed in accordance with principles set forth in the Multiple-Use Sustained-Yield Act of June 12, 1960 (74 Stat. 215; 16 U.S.C. 528-531), and the National Environmental Policy Act of 1969 (83 Stat. 852; 42 U.S.C. 4321-4347). The Program shall be prepared not later than December 31, 1975, to cover the four-year period beginning October 1, 1976, and at least each of the four fiscal decades next following such period, and shall be updated no later than during the first half of the fiscal year ending September 30, 1980, and the first half of each fifth fiscal year thereafter to cover at least each of the four fiscal decades beginning next after such updating. The Program shall include, but not be limited to—

(1) an inventory of specific needs and opportunities for both public and private program investments. The inventory

shall differentiate between activities which are of a capital nature and those which are of an operational nature;

(2) specific identification of Program outputs, results anticipated, and benefits associated with investments in such a manner that the anticipated costs can be directly compared with the total related benefits and direct and indirect returns to the Federal Government;

(3) a discussion of priorities for accomplishment of inventoried Program opportunities, with specified costs, outputs, results, and benefits; and

(4) a detailed study of personnel requirements as needed to implement and monitor existing and ongoing programs; and

(5) Program recommendations which—

(A) evaluate objectives for the major Forest Service programs in order that multiple-use and sustained-yield relationships among and within the renewable resources can be determined;

(B) explain the opportunities for owners of forests and rangeland to participate in programs to improve and enhance the condition of the land and the renewable resource products therefrom;

(C) recognize the fundamental need to protect and, where appropriate, improve the quality of soil, water, and air resources;

(D) state national goals that recognize the interrelationships between and interdependence within the renewable resources; and

(E) evaluate the impact of the export and import of raw logs upon domestic timber supplies and prices. (16 U.S.C. 1602)

Sec. 5. National Forest System Resource Inventories.—As a part of the Assessment, the Secretary of Agriculture shall develop and maintain on a continuing basis a comprehensive and appropriately detailed inventory of all National Forest System lands and renewable resources. This inventory shall be kept current so as to reflect changes in conditions and identify new and emerging resources and values. (16 U.S.C. 1603)

Sec. 6. National Forest System Resource Planning.—(a) As a part of the Program provided for by section 3 of this Act, the Secretary of Agriculture shall develop, maintain, and, as appropriate, revise land and resource management plans for units of the National Forest System, coordinated with the land and resource management planning processes of State and local governments and other Federal agencies.

(b) In the development and maintenance of land management plans for use on units of the National Forest System, the Secretary shall use a systematic interdisciplinary approach to achieve integrated consideration of physical, biological, economic, and other sciences.

(c) The Secretary shall begin to incorporate the standards and guidelines required by this section in plans for units of the National Forest System as soon as practicable after enactment of this subsection and shall attempt to complete such incorporation

for all such units by no later than September 30, 1985. The Secretary shall report to the Congress on the progress of such incorporation in the annual report required by section 8(c) of this Act. Until such time as a unit of the National Forest System is managed under plans developed in accordance with this Act, the management of such unit may continue under existing land and resource management plans.

(d) The Secretary shall provide for public participation in the development, review, and revision of land management plans including, but not limited to, making the plans or revisions available to the public at convenient locations in the vicinity of the affected unit for a period of at least three months before final adoption, during which period the Secretary shall publicize and hold public meetings or comparable processes at locations that foster public participation in the review of such plans or revisions.

(e) In developing, maintaining, and revising plans for units of the National Forest System pursuant to this section, the Secretary shall assure that such plans—

(1) provide for multiple use and sustained yield of the products and services obtained therefrom in accordance with the Multiple-Use Sustained-Yield Act of 1960, and, in particular, include coordination of outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness; and

(2) determine forest management systems, harvesting levels, and procedures in the light of all of the uses set forth in subsection (c)(1), the definition of the terms 'multiple use' and 'sustained yield' as provided in the Multiple-Use Sustained-Yield Act of 1960, and the availability of lands and their suitability for resource management.

(f) Plans developed in accordance with this section shall—

(1) form one integrated plan for each unit of the National Forest System, incorporating in one document or one set of documents, available to the public at convenient locations, all of the features required by this section;

(2) be embodied in appropriate written material, including maps and other descriptive documents, reflecting proposed and possible actions, including the planned timber sale program and the proportion of probable methods of timber harvest within the unit necessary to fulfill the plan;

(3) be prepared by an interdisciplinary team. Each team shall prepare its plan based on inventories of the applicable resources of the forest;

(4) be amended in any manner whatsoever after final adoption after public notice, and, if such amendment would result in a significant change in such plan, in accordance with the provisions of subsections (e) and (f) of this section and public involvement comparable to that required by subsection (d) of this section; and

(5) be revised (A) from time to time when the Secretary finds conditions in a unit have significantly changed, but at least every fifteen years, and (B) in accordance with the provisions of subsections (e) and (f) of this section and public

involvement comparable to that required by subsection (d) of this section.

(g) As soon as practicable, but not later than two years after enactment of this subsection, the Secretary shall in accordance with the procedures set forth in section 553 of title 5, United States Code, promulgate regulations, under the principles of the Multiple-Use Sustained-Yield Act of 1960, that set out the process for the development and revision of the land management plans, and the guidelines and standards prescribed by this subsection. The regulations shall include, but not be limited to—

(1) specifying procedures to insure that land management plans are prepared in accordance with the National Environmental Policy Act of 1969, including, but not limited to, direction on when and for what plans an environmental impact statement required under section 102(2)(C) of that Act shall be prepared;

(2) specifying guidelines which—

(A) require the identification of the suitability of lands for resource management;

(B) provide for obtaining inventory data on the various renewable resources, and soil and water, including pertinent maps, graphic material, and explanatory aids; and

(C) provide for methods to identify special conditions or situations involving hazards to the various resources and their relationship to alternative activities;

(3) specifying guidelines for land management plans developed to achieve the goals of the Program which—

(A) insure consideration of the economic and environmental aspects of various systems of renewable resource management, including the related systems of silviculture and protection of forest resources, to provide for outdoor recreation (including wilderness), range, timber, watershed, wildlife, and fish;

(B) provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives, and within the multiple-use objectives of a land management plan adopted pursuant to this section, provide, where appropriate, to the degree practicable, for steps to be taken to preserve the diversity of tree species similar to that existing in the region controlled by the plan;

(C) insure research on and (based on continuous monitoring and assessment in the field) evaluation of the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land;

(D) permit increases in harvest levels based on intensified management practices, such as reforestation, thinning, and tree improvement if (i) such practices justify increasing the harvests in accordance with the Multiple-Use Sustained-Yield Act of 1960, and (ii) such harvest levels are decreased at the end of each planning period if such practices cannot be successfully implemented or

funds are not received to permit such practices to continue substantially as planned;

(E) insure that timber will be harvested from National Forest System lands only where—

(i) soil, slope, or other watershed conditions will not be irreversibly damaged;

(ii) there is assurance that such lands can be adequately restocked within five years after harvest;

(iii) protection is provided for streams, streambanks, shorelines, lakes, wetlands, and other bodies of water from detrimental changes in water temperatures, blockages of water courses, and deposits of sediment, where harvests are likely to seriously and adversely affect water conditions or fish habitat; and

(iv) the harvesting system to be used is not selected primarily because it will give the greatest dollar return or the greatest unit output of timber; and

(F) insure that clearcutting, seed tree cutting, shelterwood cutting, and other cuts designed to regenerate an even-aged stand of timber will be used as a cutting method on National Forest System lands only where—

(i) for clearcutting, it is determined to be the optimum method, and for other such cuts it is determined to be appropriate, to meet the objectives and requirements of the relevant land management plan;

(ii) the interdisciplinary review as determined by the Secretary has been completed and the potential environmental, biological, esthetic, engineering, and economic impacts on each advertised sale area have been assessed, as well as the consistency of the sale with the multiple use of the general area;

(iii) cut blocks, patches, or strips are shaped and blended to the extent practicable with the natural terrain;

(iv) there are established according to geographic areas, forest types, or other suitable classifications the maximum size limits for areas to be cut in one harvest operation, including provision to exceed the established limits after appropriate public notice and review by the responsible Forest Service officer one level above the Forest Service officer who normally would approve the harvest proposal: *Provided*, That such limits shall not apply to the size of areas harvested as a result of natural catastrophic conditions such as fire, insect and disease attack, or windstorm; and

(v) such cuts are carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and esthetic resources, and the regeneration of the timber resource.

(h)(1) In carrying out the purposes of subsection (g) of this section, the Secretary of Agriculture shall appoint a committee of scientists who are not officers or employees of the Forest Service. The committee shall provide scientific and technical advice

and counsel on proposed guidelines and procedures to assure that an effective interdisciplinary approach is proposed and adopted. The committee shall terminate upon promulgation of the regulations, but the Secretary may, from time to time, appoint similar committees when considering revisions of the regulations. The views of the committees shall be included in the public information supplied when the regulations are proposed for adoption.

(2) Clerical and technical assistance, as may be necessary to discharge the duties of the committee, shall be provided from the personnel of the Department of Agriculture.

(3) While attending meetings of the committee, the members shall be entitled to receive compensation at a rate of \$100 per diem, including traveltime, and while away from their homes or regular places of business they may be allowed travel expenses, including per diem in lieu of subsistence, as authorized by section 5703 of title 5, United States Code, for persons in the Government service employed intermittently.

(i) Resource plans and permits, contracts, and other instruments for the use and occupancy of National Forest System lands shall be consistent with the land management plans. Those resource plans and permits, contracts, and other such instruments currently in existence shall be revised as soon as practicable to be made consistent with such plans. When land management plans are revised, resource plans and permits, contracts, and other instruments, when necessary, shall be revised as soon as practicable. Any revision in present or future permits, contracts, and other instruments made pursuant to this section shall be subject to valid existing rights.

(j) Land management plans and revisions shall become effective thirty days after completion of public participation and publication of notification by the Secretary as required under section 6(d) of this Act.

(k) In developing land management plans pursuant to this Act, the Secretary shall identify lands within the management area which are not suited for timber production, considering physical, economic, and other pertinent factors to the extent feasible, as determined by the Secretary, and shall assure that, except for salvage sales or sales necessitated to protect other multiple-use values, no timber harvesting shall occur on such lands for a period of 10 years. Lands once identified as unsuitable for timber production shall continue to be treated for reforestation purposes, particularly with regard to the protection of other multiple-use values. The Secretary shall review his decision to classify these lands as not suited for timber production at least every 10 years and shall return these lands to timber production whenever he determines that conditions have changed so that they have become suitable for timber production.

(l) The Secretary shall—

(1) formulate and implement, as soon as practicable, a process for estimating long-terms costs and benefits to support the program evaluation requirements of this Act. This process shall include requirements to provide information on a representative sample basis of estimated expenditures associated with the reforestation, timber stand improvement,

and sale of timber from the National Forest System, and shall provide a comparison of these expenditures to the return to the Government resulting from the sale of timber; and

(2) include a summary of data and findings resulting from these estimates as a part of the annual report required pursuant to section 8(c) of this Act, including an identification on a representative sample basis of those advertised timber sales made below the estimated expenditures for such timber as determined by the above cost process; and

(m) The Secretary shall establish—

(1) standards to insure that, prior to harvest, stands of trees throughout the National Forest System shall generally have reached the culmination of mean annual increment or growth (calculated on the basis of cubic measurement or other methods of calculation at the discretion of the Secretary): *Provided*, That these standards shall not preclude the use of sound silvicultural practices, such as thinning or other stand improvement measures: *Provided further*, That these standards shall not preclude the Secretary from salvage or sanitation harvesting of timber stands which are substantially damaged by fire, windthrow or other catastrophe, or which are in imminent danger from insect or disease attack; and

(2) exceptions to these standards for the harvest of particular species of trees in management units after consideration has been given to the multiple uses of the forest including, but not limited to, recreation, wildlife habitat, and range and after completion of public participation processes utilizing the procedures of subsection (d) of this section. (16 U.S.C. 1604)

Sec. 7. Cooperation in Resource Planning.—The Secretary of Agriculture may utilize the Assessment, resource surveys, and Program prepared pursuant to this Act to assist States and other organizations in proposing the planning for the protection, use, and management of renewable resources on non-Federal land. (16 U.S.C. 1605)

Sec. 8. National Participation.—(a) On the date Congress first convenes in 1976 and thereafter following each updating of the Assessment and the Program, the President shall transmit to the Speaker of the House of Representatives and the President of the Senate, when Congress convenes, the Assessment as set forth in section 3 of this Act and the Program as set forth in section 4 of this Act, together with a detailed Statement of Policy intended to be used in framing budget requests by that Administration for Forest Service activities for the five- or ten-year program period beginning during the term of such Congress for such further action deemed appropriate by the Congress. Following the transmission of such Assessment, Program, and Statement of Policy, the President shall, subject to other actions of the Congress, carry out programs already established by law in accordance with such Statement of Policy or any subsequent amendment or modification thereof approved by the Congress, unless, before the end of the first period of ninety calendar days

of continuous session of Congress after the date on which the President of the Senate and the Speaker of the House are recipients of the transmission of such Assessment, Program, and Statement of Policy, either House adopts a resolution reported by the appropriate committee of jurisdiction disapproving the Statement of Policy. For the purpose of this subsection, the continuity of a session shall be deemed to be broken only by an adjournment sine die, and the days on which either House is not in session because of an adjournment of more than three days to a day certain shall be excluded in the computation of the sixty-day period. Notwithstanding any other provision of this Act, Congress may revise or modify the Statement of Policy transmitted by the President, and the revised or modified Statement of Policy shall be used in framing budget requests.

(b) Commencing with the fiscal budget for the year ending September 30, 1977, requests presented by the President to the Congress governing Forest Service activities shall express in qualitative and quantitative terms the extent to which the programs and policies projected under the budget meet the policies approved by the Congress in accordance with subsection (a) of this section. In any case in which such budget so presented recommends a course which fails to meet the policies so established, the President shall specifically set forth the reason or reasons for requesting the Congress to approve the lesser programs or policies presented. Amounts appropriated to carry out the policies approved in accordance with subsection (a) of this section shall be expended in accordance with the Congressional Budget and Impoundment Control Act of 1974, Public Law 93-344.

(c) For the purpose of providing information that will aid Congress in its oversight responsibilities and improve the accountability of agency expenditures and activities, the Secretary of Agriculture shall prepare an annual report which evaluates the component elements of the Program required to be prepared by section 3 of this Act which shall be furnished to the Congress at the time of submission of the annual fiscal budget commencing with the third fiscal year after the enactment of this Act. With regard to the research component of the program, the report shall include, but not be limited to, a description of the status of major research programs, significant findings, and how these findings will be applied in National Forest System management.

(d) These annual evaluation reports shall set forth progress in implementing the Program required to be prepared by section 3 of this Act, together with accomplishments of the Program as they relate to the objectives of the Assessment. Objectives should be set forth in qualitative and quantitative terms and accomplishments should be reported accordingly. The report shall contain appropriate measurements of pertinent costs and benefits. The evaluation shall assess the balance between economic factors and environmental quality factors. Program benefits shall include, but not be limited to, environmental quality factors such as esthetics, public access, wildlife habitat, recreational and wilderness use, and economic factors such as the excess of cost savings over the value of foregone benefits and the rate of return on renewable resources.

(e) The reports shall indicate plans for implementing corrective action and recommendations for new legislation where warranted.

(f) The reports shall be structured for Congress in concise summary form with necessary detailed data in appendices. (16 U.S.C. 1606)

Sec. 9. National Forest System Program Elements.—The Secretary of Agriculture shall take such action as will assure that the development and administration of the renewable resources of the National Forest System are in full accord with the concepts for multiple use and sustained yield of products and services as set forth in the Multiple-Use Sustained-Yield Act of 1960. To further these concepts, the Congress hereby sets the year 2000 as the target year when the renewable resources of the National Forest System shall be in an operating posture whereby all backlogs of needed treatment for their restoration shall be reduced to a current basis and the major portion of planned intensive multiple-use sustained-yield management procedures shall be installed and operating on an environmentally-sound basis. The annual budget shall contain requests for funds for an orderly program to eliminate such backlogs: *Provided*, That when the Secretary finds that (1) the backlog of areas that will benefit by such treatment has been eliminated, (2) the cost of treating the remainder of such area exceeds the economic and environmental benefits to be secured from their treatment, or (3) the total supplies of the renewable resources of the United States are adequate to meet the future needs of the American people, the budget request for these elements of restoration may be adjusted accordingly. (16 U.S.C. 1607)

Sec. 10. Transportation System.—(a) The Congress declares that the installation of a proper system of transportation to service the National Forest System, as is provided for in Public Law 88-657, the Act of October 13, 1964 (16 U.S.C. 532-538), shall be carried forward in time to meet anticipated needs on an economic and environmentally sound basis, and the method chosen for financing the construction and maintenance of the transportation system should be such as to enhance local, regional, and national benefits, except that the financing of forest development roads as authorized by clause (2) of section 4 of the Act of October 13, 1964, shall be deemed “budget authority” and “budget outlays” as those terms as defined in section 3(a) of the Congressional Budget and Impoundment Control Act of 1974 and shall be effective for any fiscal year only in the manner required for new spending authority as specified by section 401(a) of that Act.

(b) Unless the necessity for a permanent road is set forth in the forest development road system plan, any road constructed on land of the National Forest System in connection with a timber contract or other permit or lease shall be designed with the goal of reestablishing vegetative cover on the roadway and areas where the vegetative cover has been disturbed by the construction of the road, within ten years after the termination of the contract, permit, or lease either through artificial or natural

means. Such action shall be taken unless it is later determined that the road is needed for use as a part of the National Forest Transportation System.

(c) Roads constructed on National Forest System lands shall be designed to standards appropriate for the intended uses, considering safety, cost of transportation, and impacts on land and resources. (16 U.S.C. 1608)

Sec. 11. (a) National Forest System Defined.—Congress declares that the National Forest System consists of units of federally owned forest, range, and related lands throughout the United States and its territories, united into a nationally significant system dedicated to the long-term benefit for present and future generations, and that it is the purpose of this section to include all such areas into one integral system. The “National Forest System” shall include all national forest lands reserved or withdrawn from the public domain of the United States, all national forest lands acquired through purchase, exchange, donation, or other means, the national grasslands and land utilization projects administered under title III of the Bankhead-Jones Farm Tenant Act (50 Stat. 525, 7 U.S.C. 1010-1012), and other lands, waters, or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system. Notwithstanding the provisions of the Act of June 4, 1897 (30 Stat. 34; 16 U.S.C. 473), no land now or hereafter reserved or withdrawn from the public domain as national forests pursuant to the Act of March 3, 1891 (26 Stat. 1103; 16 U.S.C. 471), or any act supplementary to and amendatory thereof, shall be returned to the public domain except by an act of Congress.

(b) The on-the-ground field offices, field supervisory offices, and regional offices of the Forest Service shall be so situated as to provide the optimum level of convenient, useful services to the public, giving priority to the maintenance and location of facilities in rural areas and towns near the national forest and Forest Service program locations in accordance with the standards in section 901(b) of the Act of November 30, 1970 (84 Stat. 1383), as amended. (16 U.S.C. 1609)

Sec. 12. Renewable Resources.—In carrying out this Act, the Secretary of Agriculture shall utilize information and data available from other Federal, State, and private organizations and shall avoid duplication and overlap of resource assessment and program planning efforts of other Federal agencies. The term “renewable resources” shall be construed to involve those matters within the scope of responsibilities and authorities of the Forest Service on the date of this Act and on the date of enactment of any legislation amendatory or supplementary thereto. (16 U.S.C. 1610)

Sec. 13. Limitations on Timber Removal.—(a) The Secretary of Agriculture shall limit the sale of timber from each national forest to a quantity equal to or less than a quantity which can be removed from such forest annually in perpetuity on a

sustained-yield basis: *Provided*, That, in order to meet overall multiple-use objectives, the Secretary may establish an allowable sale quantity for any decade which departs from the projected long-term average sale quantity that would otherwise be established: *Provided further*, That any such planned departure must be consistent with the multiple-use management objectives of the land management plan. Plans for variations in the allowable sale quantity must be made with public participation as required by section 6(d) of this Act. In addition, within any decade, the Secretary may sell a quantity in excess of the annual allowable sale quantity established pursuant to this section in the case of any national forest so long as the average sale quantities of timber from such national forest over the decade covered by the plan do not exceed such quantity limitation. In those cases where a forest has less than two hundred thousand acres of commercial forest land, the Secretary may use two or more forests for purposes of determining the sustained yield.

(b) Nothing in subsection (a) of this section shall prohibit the Secretary from salvage or sanitation harvesting of timber stands which are substantially damaged by fire, windthrow, or other catastrophe, or which are in imminent danger from insect or disease attack. The Secretary may either substitute such timber for timber that would otherwise be sold under the plan or, if not feasible, sell such timber over and above the plan volume. (16 U.S.C. 1611)

Sec. 14. Public Participation and Advisory Boards.—(a) In exercising his authorities under this Act and other laws applicable to the Forest Service, the Secretary, by regulation, shall establish procedures, including public hearings where appropriate, to give the Federal, State, and local governments and the public adequate notice and an opportunity to comment upon the formulation of standards, criteria, and guidelines applicable to Forest Service programs.

(b) In providing for public participation in the planning for and management of the National Forest System, the Secretary, pursuant to the Federal Advisory Committee Act (86 Stat. 770) and other applicable law, shall establish and consult such advisory boards as he deems necessary to secure full information and advice on the execution of his responsibilities. The membership of such boards shall be representative of a cross section of groups interested in the planning for and management of the National Forest System and the various types of use and enjoyment of the lands thereof. (16 U.S.C. 1612)

Sec. 15. Regulations.—The Secretary of Agriculture shall prescribe such regulations as he determines necessary and desirable to carry out the provisions of this Act. (16 U.S.C. 1613)

Sec. 16. Severability.—If any provision of this Act or the application thereof to any person or circumstances is held invalid, the validity of the remainder of the Act and of the application of such provision to other persons and circumstances shall not be affected thereby. (16 U.S.C. 1614)

APPENDIX B

PUBLIC INVOLVEMENT IN THE RPA ASSESSMENT AND
PROGRAM DEVELOPMENT PROCESS

Summary

This section dealing with public participation in the 1980 RPA Program consists of: (a) the procedure and timetable used to obtain public comments, and a synopsis of comments received at each step in the procedure; (b) the comparative input analysis system used to categorize and compile comments; (c) summary tables about respondents; (d) summaries of responses about Alternative Program Directions, Policy Issues, and new issues raised; and (e) answers prepared by the Forest Service to general categories of questions raised during public participation, which were used in subsequent briefings about RPA.

As required by the Resources Planning Act, the public was involved in the 1980 planning effort and provided comments on the draft Assessment and Program that were used to prepare the final Assessment and Program. All interested publics had opportunities to learn and comment on the contents and selection of the Assessment and Program through numerous public briefings held throughout the country during the months of April, May, and June of 1979. In addition to these scheduled sessions, local Forest Service officials met and answered questions from interested groups, individuals, agencies, and officials. Copies of the draft Assessment and Program also were available for review. Oral and written comments made during the meetings and briefings, and written comments received later were reviewed and summarized. The Forest Service reviewed over 1,600 written comments during the public comment period, then systematically identified and summarized them. The recommendations voiced were used to improve the final documents in areas such as clarifying goals and targets, correcting data errors and omissions, editorial improvements, and methodology.

PUBLIC INVOLVEMENT IN THE RPA ASSESSMENT AND PROGRAM DEVELOPMENT PROCESS

During development of the 1980 Assessment and Program, the first public involvement effort was in the development of two documents: (1) the "Draft Assessment Element Outline" and (2) the "Proposed Alternative Forest Service Program Directions and National Goals." These two documents were distributed to the public in the Spring of 1977. A total of 645 responses were analyzed to determine areas of public concern about the development process and the content of the documents. The analysis procedure used here was a content analysis, similar to that used in subsequent public comment periods.

The analysis of public comment about the Assessment outline showed three major categories of responses: (1) feelings and opinions about resource management issues, (2) needs for additional information about the items included in the outline, and (3) needs for items not included in the Assessment outline. Since the immediate purpose was to determine adequacy of the outline, comments on feelings and opinions about resource management were stored for later analysis and for use in the development and review of the 1980 RPA

Items were identified that the public suggested should be included in the Assessment outline. Such input was especially helpful at this early stage because it dealt directly with the adequacy of the proposed document. The analysis of public comment indicated that a number of items should be considered in the preparation of the Assessment. These items were considered and changes were made in the Assessment:

1. A discussion of opportunities for changing the demand-supply outlook was expanded to include management, technical and financial assistance, research, urban forestry, the environment and resource implications.
2. To facilitate local, State, and regional planning, the areas to which land capability data apply were made as small as possible in the Assessment. Supply-demand projections in the 1979 Assessment were shown for seven major geographic regions; relevant data for States and ecosystems were made available on request.
3. Where appropriate, discussion was added about opportunities for protecting forest and range lands from destructive agents and about the impacts of such protection on the environment and other resources.
4. A discussion of endangered and threatened plant species was included.
5. Several refinements in basic assumptions were made:
 - a. Where appropriate, basic socioeconomic characteristics such as age, education, and income were included in regional and national population projections.
 - b. Where they appeared to be significant, the impacts of energy supplies and costs were taken into account in projecting demands and supplies of renewable resource products.
6. The discussion of multiple use was greatly expanded.

7. It was suggested that minerals and mineral extraction should receive increased emphasis in the 1979 Assessment. It was decided that since the Assessment is confined to renewable resources, a chapter on minerals would not be appropriate. However, the material on minerals was expanded to provide the information needed in developing a Forest Service minerals program.

8. A discussion of wetlands was included in the Assessment.

9. The Assessment's treatment of wildlife and fish was greatly expanded. Ecological needs of various wildlife and fish species were considered. Data from State agencies as well as the Fish and Wildlife Service and the National Marine Fisheries Service were used in analyses. Information on effects of ownership and regulation upon wildlife and fish resources was also added to the Assessment. Information on interactions between wildlife and livestock--both predation and competition for forage--was included to the extent that existing data permit.

10. Factors for recreation facilities and land availability, based on national inventories, were added to the demand analysis for the 1979 Assessment.

11. Opportunities to add new wilderness areas and to manage existing areas were described.

12. Discussions of interaction between livestock and other resources were included in sections on multiple use in the forest and range lands chapter and in the multiresource interaction chapter. Also added was a discussion on the impacts of public livestock grazing on economic and social aspects of local communities.

13. Two additions were made to the Assessment's discussion of timber: (1) a discussion of accelerated harvesting of softwood timber inventories on Federal lands as a way of temporarily increasing timber supplies, and (2) a discussion of some important adverse consequences of such action.

14. Information about water production and water quality was more clearly related to other uses of forest and range lands.

Public comment on the draft Program also was used to modify and improve that document. Reaction to the process used to develop the 1975 RPA Program was generally favorable, but the connection between the Assessment and Program was not apparent to many people. There also was some misunderstanding about how Alternative Program Directions were to be considered. Some reviewers wanted the Forest Service to be totally responsive to public input, while others preferred arbitrary leadership. Other concerns were that the land management process and State involvement were not adequately explained, and that multiple use was not adequately emphasized. As a result it was decided that the Forest Service would revise the development process used in 1975 in four major ways: (1) The linkage between the Assessment and the Program would be made more apparent. (2) The description of and basis for the Alternative Programs Directions and goals would be improved. (3) The relationship and coordination of National Forest land management planning and other Federal, State, local, and private planning would be described. (4) Although the RPA Program was to be a national document, it would be regionalized for clearer understanding.

Many reviewers disagreed with some of the basic assumptions and raised questions about consistency among them. Others were concerned that broad assumptions, nationwide in scope, did not recognize local conditions, and that support activities such as protection and transportation were not adequately stressed. In addition, serious questions about using different assumptions for each Alternative were raised. It was decided that one set of assumptions applicable to all Alternatives would be used to facilitate comparisons among Alternatives. Assumptions would be modified and added where needed to improve consistency between general and specific assumptions, and assumptions on multiple-use management and energy would be added to each Alternative.

Reviewers generally accepted and understood the process used to develop the five Alternative Program Directions.

1978 Progress Report

The next big step in the RPA process that involved the public came in January 1978, when the Forest Service distributed "The Resources Planning Act-- A Progress Report." This was done as part of a continuing effort to keep the public abreast of the agency's preparation of the 1979 Assessment, the 1980 Program, and the Draft Environmental Statement. The public responded with 434 letters, 50 form letters, and 1 petition. A comparative input analysis was done by each of the nine Regions and the Washington Office; the results of the analyses were consolidated into one report.

The largest number of responses addressed nonindustrial private forest lands, timber import and export, water rights, energy, taxation, fish and wildlife, and eastern National Forests. Some major points in the comments were:

1. Private woodlands could make a significant contribution toward fulfilling the Nation's future timber needs, and that the Forest Service should encourage optimum use of private woodlands by informing, assisting, and cooperating with private landowners. This could be done through technical assistance, tax incentives, and cost-sharing. Some people cautioned that the Forest Service's role should not go beyond that of voluntary assistance except to avoid degradation that would affect surrounding land holdings. The free market, they said, offers adequate incentives for timber production.

2. With respect to timber, concerns included: dealing effectively with future demands, continuation of vigorous research by the Federal Government, improved utilization, assessment of the forest composition issue, and shorter timber rotations on National Forest lands.

3. Those favoring export of goods argued that it helped our balance of trade and was essential to a healthy economy. Those in opposition said exporting goods would increase the rate of inflation.

4. Concerns were expressed about water quantity, water quality, and water rights.

5. There were conflicting opinions about the degree of environmental impacts caused by mining and whether mining on National Forest land should be permitted or encouraged.

6. On the subject of taxation, public response was focused on four areas: (1) tax summary; (2) provision for impacts of all taxes, State-by-State; (3) impact of current tax structure on small farm families; and (4) a study of the current tax system.

7. Public response addressed two major areas regarding fish and wildlife: (1) quantities and qualities of fish and wildlife and their habitats, and (2) concern about domestic livestock and wildlife competition for forage.

8. The issue of Eastern National Forests was addressed mainly by government and Forest Service personnel. They saw a need to improve ownership patterns in the East through trade and increased purchase of forest land.

The public also commented on the overall additions, deletions, and inadequacies of the Assessment and Program documents, the Alternatives, and RPA in general:

1. Suggestions for the Assessment were: (1) add a section outlining the responsibilities of the Forest Service in the area of mineral management; (2) describe specific policy direction for broadening special-use fees for forest lands for nonmarket output; (3) improve the economic framework for analysis; and (4) improve coordination with other Federal Agencies.

2. For the Program, suggestions included a need for: (1) methods of comparing interrelationships of major components of Forest Service programs with past and present administrative costs of Forest Service accomplishments within cooperative assistance and State cooperative programs; (2) cost-benefit ratios and an economic framework for comparison of Alternatives; (3) a section discussing pest control, reforestation, endangered plant species, and technology transfer; (4) separate sections for recreation and wilderness; and (5) description of evaluation criteria with each Alternative evaluated and chosen accordingly.

3. Several respondents suggested that for the Alternatives there should be a better method of comparing programs. They recommended that the Alternatives remain flexible to allow for unforeseen conditions and include an in-depth analysis of the expected returns on dollars invested.

4. Few comments addressed RPA in general but those that did said regionalization would help aid in clearly identifying Forest Service activities affecting nonmarket outputs. It was argued that an Alternative appropriate for the East might not be appropriate for the West. Need for an overview of the relationship of RPA to other planning processes was expressed.

Draft Documents

The next major step involving the public was the issuance of the draft Program, Assessment, and Report documents in March 1979. Besides the three documents that were released for public comment, the Forest Service released a brochure "The Resource Planning Act and You" designed to encourage public participation in RPA. The brochure was distributed to approximately 40,000 people and groups affected by or interested in Forest Service programs.

Advanced schedules of the public participation program were mailed directly to key officials and leaders, national organizations, major groups and

Government agencies. The schedule identified national and regional briefing sessions by State, city, date, location, and time. The schedule was published in organizational newsletters and The Federal Register.

In addition to the series of public participation sessions noted, the Forest Service announced in local press releases, The Federal Register, speeches, press briefings, and by direct mail that agency personnel would "meet with any interested groups, individuals, agencies, and officials to explain the documents and answer questions." This effort was made to provide personal one-to-one assistance to any individual, organization, or agency wanting to understand and comment on any part of the RPA documents.

A variety of informational material was used by the Forest Service nationwide to help the public understand and encourage comment about RPA. These included: (1) a 9-page question and answer document used in the briefings and as a handout; (2) the RPA Report and two technical documents; (3) the 1979 brochure, "The Resources Planning Act and You"; (4) RPA Slide Program and filmograph (The Heritage); (5) a film (Common Ground); (6) a special RPA program involving a series of seminars held with the National Council of Negro Women; and (7) a series of workshops conducted to help reach urban minorities (this is being expanded for future RPA public participation efforts).

Each Forest Service Region developed additional information packets about RPA. For example, one Region developed information-response packets in accordance with national guidelines and then its field offices mailed a locally designed RPA information-response packet to over 1,500 local publics. The same packet was given to 500 others through direct personal contacts, and hundreds more were given out on request to visitors, and at meetings and briefings.

Media coverage was also sought and obtained by Forest Service field offices. One Region mailed press packages to 675 media offices (urban newspapers, commercial and educational TV stations, radio stations, and minority publications). News releases for urban meetings were given to newspapers within a 50-mile radius of the meeting site. During June 1979, teams from various Forest Service Regions and the Washington Office analyzed the approximately 1,700 comments that were received.

In the West, Alternative Program Directions (APD's) 3, 1, and 4 were preferred, in that order. Generally, respondents felt APD 3 was a balanced multiple-use program. The prime reason for supporting APD 1 was its high market level combined with environmental protection. Support for APD 4 centered on increasing current levels of wildlife and fish, recreation, and State and private programs.

In the East, APD's 3 and 4, singly or in modified combination, were addressed most often. Their moderate cost and production levels, improvement in State and Private Forestry and Research programs, and high wilderness and wildlife targets were favored. However, some respondents were concerned about APD 4 reducing production of commodities from National Forest lands.

Most respondents who suggested modifications of an APD simply wanted to increase or decrease emphasis on a particular element.

The State and Private Forestry program received broad support from many sectors for a variety of reasons. Some respondents favored a strengthened

commodity production from the National Forest System to the private sector and thereby "save" the National Forests for nonmarket uses. Other respondents agreed that we need a strong State and Private Forestry program in addition to, but not as a result of, a shift from NFS lands. In the eastern half of the Nation, a large proportion of respondents commented on the need for increased attention to hardwoods as a source of timber products. Significant numbers of people commented on the need to emphasize technical assistance, the application of technology, and more educational opportunities to increase public and land-owner awareness of multiresource land management.

Areas cited for increased research emphasis included: (1) improved biomass production; (2) improved wildlife and range habitats; (3) improved timber utilization to extend wood supplies; (4) improved silviculture practices to increase forest growth and timber yields; (5) increased opportunities to utilize eastern hardwoods; and (6) better ways to control forest pests.

Respondents nationwide had ideas about policy issues, APD's, and the role that National Forest Systems should play in providing market and nonmarket goods and services. Many respondents felt that balanced uses were necessary on National Forest lands. They suggested that more emphasis be placed on the private sector to produce market goods, while giving strong environmental consideration to National Forest resources through better management practices. Also suggested by respondents was expansion of recreation opportunities near population centers. Respondents also stated that chemical control of vegetation and pests should be limited to the most critical situations and that research should emphasize biological and natural controls.

Respondents commenting on issues related to timber supply and use questions (policy issues 2-5) generally favored continuation of present policies, including nondeclining even flow.

While most respondents accepted limited use of pesticides and herbicides (policy issues 6 and 7) in an environmentally safe way, a significant element wanted alternative pest control methods.

Comments on consumer payments for nonmarket goods and services (issue 8) and the financing of capital investments (issue 9) favored higher fees and more capital investment from private sources and National Forest receipts.

Respondents addressing policy issues 10, 13, and 14, dealing with National Forest System activities in recreation, forage, and mineral development favored: (1) continuation of present recreation policy with emphasis on developed recreation near urban areas, while leaving remaining areas for dispersed recreation; (2) improvement in rangeland conditions; and (3) energy and nonenergy mineral exploration and development. Respondents felt environmental safeguards should be emphasized in carrying out forage and mineral activities.

Many respondents wanted to increase purchases of land for Eastern National Forests (policy issue 11). Many wanted them managed for production of nonmarket goods and services.

Issues 1, 12, and 15 dealt with planning and development for nonindustrial private and non-Federal public forests and range lands. Respondents to issue 1 favored expansion of cooperative efforts to improve forest management on small, privately owned lands. Issue-12 respondents wanted expanded State planning

efforts for these same lands. Some respondents favored and others opposed increased Federal expenditures for management of State and local public lands.

Several new issues were recommended for study and resolution. They varied by subject matter and by the geographic location of the respondent. Many respondents expressed a need to present additional issues dealing specifically with wildlife and water problems.

Comments about supply and demand assessments varied. Respondents felt that disposable income projections were too high and that inflation would reduce buying power. They argued that the energy situation deserved more attention. Wildlife and fish assessments were questioned by respondents across the Nation, but especially in the West.

Many respondents said more detailed descriptions of decision criteria were needed. They also felt local energy, economic, and environmental concerns deserved special attention.

As part of the review process of public participation, responses were prepared to a number of questions and comments that appeared to be of widespread concern. Samples of these responses are shown in this Appendix. These responses also had been prepared in order to develop the changes that would be made in the Assessment and Program documents.

COMPARATIVE INPUT ANALYSIS SYSTEM FOR RPA PUBLIC COMMENT

Objectives

The objectives of the Comparative Input Analysis System were:

1. Identify public concerns and rationale relevant to the RPA Assessment Program and Report documents.
2. Identify agreement between affected interests regarding the proposed Alternative Program Directions (APD's) and/or modifications.
3. Facilitate decisions for appropriate action by analyzing public concerns (policy issues, decision criteria, supply and demand assessment) and rationale relevant to the Alternative Program Directions.
4. Organize and display public comment for evaluative considerations and analytical comparison with other decision criteria.

General Guidelines

The Comparative Input Analysis System was designed to place emphasis on the qualitative content of responses from affected interests with provision for quantitative analysis as well. The system blended essential features of two other Forest Service methods, Codinvolve and Content Summary Analysis. It is a traceable and visible system that provides for the summarization, organization, and documentation of public response in an objective and

systematic manner. Because RPA public input reflected the complex policy and technical issues of the Assessment and Program documents, the focus of this analysis system was to examine the argumentation and evidence given by the public and to identify where the focus of agreement and disagreement lay among the various categories of public respondents. The system helped determine what facts were in question; what primary argumentation was advanced by various segments of the public; where segments agreed and disagreed; and how regions of the country concurred or differed on issues initially raised by the Agency as well as those raised in public comment.

Reports

Forest Service Regional reports were developed from responses originating in respective Regions and from responses that came outside the Region directing comment solely to a particular Region.

The Washington Office prepared a report primarily from responses originating in the Washington, D.C. area. These usually consisted of comments from national interest groups and organizations. The nine Regional Reports and the Washington Report were consolidated into a National Summary.

Analysis Teams

Regional teams consisted of a minimum of four members. Each team comprised the following:

1. Public Information Specialist--At least one representative with demonstrated experience in content analysis systems.
2. State and Private Forestry--At least one representative.
3. Land Management Planning or Program, Planning and Budget--At least one representative with program responsibility in RPA.
4. Research--At least one representative.

Because of RPA's complexity, team members had to be familiar with the RPA process and document content.

Analysis Locations

Preparatory work, initial coding, and sorting of regional responses were handled by each Region's Office of Information. While analysis team members oversaw any preparatory work, clerical or other support staff were used to initially code and sort incoming response.

Regional teams first met in Denver on May 29 through June 1, 1979 to begin full implementation of the system. At this session, regional teams used RPA public input collected in their Regions by May 25, 1979. The implementation session provided opportunity to determine identification and stratification of analysis reason categories based on actual public input, to prepare final definitions, and to resolve coordination and consistency problems.

The meeting also assured that analyses in all Regions were compatible and consistent.

Leaders of regional teams brought copies of their draft Regional Reports to the Washington Office on June 19, 1979, to resolve any problems on consistency of definitions, categories, format, and procedure for future development of the National Summary on public response. Team leaders then returned to their regions on June 20 to complete Regional Reports.

Leaders of regional teams met again in the Washington Office on June 25, 1979, to consolidate the nine Regional Reports and the Washington Office Report into the National Summary.

Analysis System Requirements

The analysis of RPA public comments required a system that:

1. Identifies, tabulates, and displays responses (documents) preferring an Alternative Program Direction (1-5), or an extensively modified Alternative Program Direction.
2. Identifies, tabulates, and displays responses addressing Alternative Program Directions, modified Alternative Program Directions, or other RPA areas of concern by origin, by who responded, and by form of response.
3. Identifies and displays response rationale by who responded.
4. Identifies and displays opinions and rationale on Policy Issues, Supply and Demand Assessment, Decision Criteria and other pertinent areas of concern raised by the public.

Data stratification.--Stratification used in the coding and displays of data described above included:

I. Who Responded

A. Individuals (expansion dependent upon variety of respondents).

B. Interest Groups

1. Commodity, service-producing, profit-oriented (National Forest Products Association, Independent Petroleum Association of America, Chamber of Commerce, American Mining Congress, etc. Would also include concessionaires, livestock associations, outfitters and guides, and others).
2. User-type groups, motorized recreation (AAA, National Rifle Association, Airstream Trailer Club, etc. Also includes snowmobile associations, rockhounds, recreation vehicle associations, summer home associations, and others).
3. User-type groups, nonmotorized recreation (Sierra Club, Wilderness Society, Friends of the Earth, NRDC, Audubon

Society, etc. Also includes hiking and mountaineering clubs, recreation equipment co-ops, bicyclists, and others).

4. Civic groups (League of Women Voters, Junior League, etc. Also includes garden clubs, professional societies (if not profit oriented), and others).

C. Elected Officials

1. Local
2. State (including Indian Tribes)
3. Federal

D. Public Agencies

1. Local (municipal-county entities, multicounty, and regional)
2. State (includes colleges and universities)
3. Federal

II. Where the Response Was From (Zip Codes)

III. Form of Input

- A. Letters, Reports, Response Forms, Notes
- B. Petitions
- C. Form Letters, Coupons

Data Organization.--Responses were organized by Respondent Category; comments were organized in the following manner:

I. Alternative Program Direction Data

Alternative Program Direction 1 (APD 1)

A. Forest Service Roles (Component 1)

1. National Forest System
2. State and Private Forestry
3. Research
4. Human Resource Development

B. National Goals, Outputs, and Activities by Program Element (Component 2)

1. Recreation
2. Wilderness
3. Wildlife and Fish
4. Range
5. Timber
6. Water
7. Minerals
8. Human and Community Development
9. Protection
10. Lands
11. Soils
12. Facilities

- C. Backlog (Component 3)
- D. Projected National Outputs, Activities, and Program Costs (Component 4)
- E. National Environmental Effects Elements (Component 5)
 - 1. Physical-Biological Effects
 - 2. Economic Effects
 - 3. Social Effects

Alternative Program Direction 2 (APD 2)

Alternative Program Direction 3 (APD 3)

Alternative Program Direction 4 (APD 4)

Alternative Program Direction 5 (APD 5)

Modified Alternative Program Direction

II. Policy Issues Data (comments specifically addressing policy issues; not as they relate to specific APD's)

- | | |
|-----------------|---|
| Policy Issue 1 | Production of wood and wood products from non-industrial private lands. |
| Policy Issue 2 | Level of production of wood and wood products from National Forest System lands. |
| Policy Issue 3 | Wood fiber as an energy source. |
| Policy Issue 4 | Utilization of hardwoods. |
| Policy Issue 5 | Export and import of raw logs. |
| Policy Issue 6 | Herbicides in NFS management. |
| Policy Issue 7 | Pesticides in forest and range lands management. |
| Policy Issue 8 | Consumer payments for nonmarket goods and services. |
| Policy Issue 9 | Alternative means for financing capital development on NFS lands. |
| Policy Issue 10 | Recreation development on NFS lands. |
| Policy Issue 11 | Eastern National Forests. |
| Policy Issue 12 | Multiresource planning and management of non-industrial private forest and range lands. |
| Policy Issue 13 | Forage for domestic livestock. |
| Policy Issue 14 | Minerals from NFS lands. |

III. Supply and Demand Assessment

A. Assumptions

1. Population
2. Gross National Product
3. Disposable Personal Income
4. Energy Costs
5. Capital Availability
6. Other

B. Forest and Range Lands

1. North
2. South
3. Rocky Mountains-Great Plains
4. Pacific Coast

C. Outdoor Recreation

1. Demand
2. Supply
3. Implications
4. Opportunities
5. Wilderness

D. Wildlife and Fish

1. Demand
2. Supply
3. Implications
4. Opportunities

E. Range

1. Demand
2. Range Resource
3. Demand-Supply--Price Outlook
4. Opportunities

F. Timber

1. Demand for Timber Products
2. Demand for Roundwood
3. Trade in Timber Products
4. Demand for Timber from U.S. Forests
5. Primary Timber Processing Industries
6. Domestic Timber Resources
7. Projected Timber Supplies
8. Demand-Supply--Price Outlook
9. Opportunities

G. Water

1. Demand
2. Supply
3. Water Demand-Supply Comparisons
4. Water Quality Problems
5. Opportunities

H. Other Uses and Resources

1. Minerals
2. Urban Forests
3. Wetlands
4. Summary

IV. Decision Criteria Data (not as they relate to specific APDs)

- A. Opportunity to contribute to National Needs
- B. National Direction
- C. Environmental Assessment
- D. Public Involvement
- E. Other

V. Comments Regarding Other Parts of RPA Documents

VI. Public Involvement Process Comments (later analysis)

COMPARATIVE INPUT ANALYSIS PROCESS RECEIPT AND CODING OF RESPONSE

All responses were initially processed in each Regional Office of Information. Documents received by Forest, Station, or Area Offices were forwarded to their respective Regional Office for coding.

Upon receipt at the Regional Office, response were first stamped with a respondent identification grid and then coded. The respondent identification code consisted of a respondent category identifier (who responded), an assigned sequence number by respondent category, an identifier designating the form of response, zip code number, and Forest Service Region.

Respondent Category

The respondent category identifier consists of a single-digit alpha code (A-K). These eleven alphabetic characters correspond to the four general respondent categories and seven subcategories identified in the Data Stratification Section of this paper. They are:

- A--Individuals
- B--Interest Group (commodity, service producing)
- C--Interest Group (user-type, motorized recreation oriented)
- D--Interest Group (nonmotorized, preservationists)
- E--Interest Group (civic)
- F--Elected Official (local)
- G--Elected Official (State)

H--Elected Official (Federal)
I--Public Agency (local)
J--Public Agency (State)
K--Public Agency (Federal)

Sequence Number

Sequence numbers were assigned as each response was received, by respondent category. This portion of the respondent identification code consists of a four-digit numeric code (0001-9999).

Form of Response

The form of response identifier code consisted of a single-digit alpha code:

L--Letters, reports, response forms, or notes
P--Petitions
F--Form Letters

Geographic Identifier

The geographic identifier used the standard U.S. Postal Service five-digit zip code.

An example of the complete respondent identification code:

A	0	1	1	4	L	8	0	2	2	5

The respondent was an individual; it was the 114th response received from an individual; the response was a letter; and, the response was from Colorado.

The lower portion of the respondent identification grid was used to indicate various areas commented on in the response document (i.e., whether a respondent addressed a specific APD, a modification, policy issues, supply and demand, etc.).

RO-WO Identifier

The first two spaces on the lower grid are the RO-WO identifier. This code consists of a two-digit numeric code. These are:

Region 1--01
Region 2--02
Region 3--03
Region 4--04

Region 5--05
Region 6--06
Washington Office--07
Region 8--08
Region 9--09
Region 10--10

APD Preference

The APD preference code was used if an APD was preferred. This consists of a single-digit numeric code (1-5). If no APD was preferred, an '0' was entered.

Modifications Code

If a document indicated a modification or mix, it was coded 'X'; if not, it was coded '0'. Modification or mix block were used if: one resource element was modified outside its range; two or more resource elements were significantly modified within their range; multiple (three or more) nonresource elements were altered. Judgment was exercised by an analysis team so that team discussion and agreement was mandatory.

Issues Code

The issues code were used if a document responded to one of the 15 policy issues, or their solution options. 'X' for a comment; '0' for no comment.

Supply and Demand

The Supply-Demand code was used for documents responding to supply and demand. 'X' for a comment; '0' for no comment.

Decision Criteria

The Decision Criteria code was used for documents responding to this area. 'X' for comment; '0' for no comment.

Document Related

This code was used for responses addressing the RPA documents themselves (i.e., NEPA adequacy, understandability, etc.). 'X' for comment; '0' for no comment.

PI Process

The PI Process code was used for comments addressing the RPA public involvement process. 'X' for comment; '0' for no comment.

Other Parts

This code was used for documents commenting on other parts of the RPA documents. 'X' for comment; '0' for no comment.

The last block of the grid is blank. An entry was required in all blocks except the last. An example of the complete response identification code:

0	2	3	0	X	0	X	0	0	0	

The respondent wrote about Region 2, preferred APD 3 without modification, and commented on the policy issues and decision criteria but did not comment on the supply-demand situation, the documents themselves, the public inspection process, or other parts of the RPA Documents.

RESPONDENT SUMMARY TABLES

The following tables use the abbreviations of the 50 States on the left side of the table and the letters A through K across the top of the table to identify categories of respondents.

Categories of Respondents

A--Individuals
B--Group - Commodity, service producing
C--Group - User-type, motorized recreation oriented
D--Group - Nonmotorized, preservationists
E--Group - Civic
F--Elected Official - Local
G--Elected Official - State
H--Elected Official - Federal
I--Public Agency - Local
J--Public Agency - State
K--Public Agency - Federal

Table B.1 shows how categories of respondents preferred Alternative Program Directions 1 through 5 or did not prefer or address any of the five Alternatives (the latter is identified by "0" under APD Code by each State).

Table B.2 shows the number of responses by category preferring an APD other than the five displayed in the RPA draft documents.

Table B.3 shows the number of responses by category addressing one or more of the 15 policy issues.

Table B.4 shows the number of responses by category addressing supply and demand material.

Table B.5 shows the number of responses by category addressing decision criteria.

Table B.6 shows the number of responses by category addressing document related material such as understandability.

Table B.8 shows the number of responses by category addressing the public involvement process.

Table B.1.--RPA comments on Alternative Program Directions by
respondent category

STATE CODE	APD CODE	TOTAL NO.	RESPONDENT CATEGORY										
			A	B	C	D	E	F	G	H	I	J	K
	0	23	22	0	0	0	0	0	0	0	0	1	0
	1	11	10	0	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	8	8	0	0	0	0	0	0	0	0	0	0
	4	5	3	0	0	0	1	0	0	0	0	0	1
	5	1	1	0	0	0	0	0	0	0	0	0	0
	TOTAL	48	44	0	1	0	1	0	0	0	0	1	1
AL	0	1	0	1	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	2	1	0	1	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	3	1	1	1	0	0	0	0	0	0	0	0
AK	0	46	29	8	0	4	0	0	0	0	0	3	2
	1	101	92	6	0	0	1	1	0	0	1	0	0
	2	18	18	0	0	0	0	0	0	0	0	0	0
	3	27	24	2	0	0	0	0	0	0	0	0	1
	4	36	32	2	0	0	0	0	0	0	0	0	2
	5	9	7	0	0	0	0	0	1	0	0	0	1
	TOTAL	237	202	18	0	4	1	1	1	0	1	3	6
AZ	0	33	12	1	0	1	1	0	0	0	1	15	2
	1	9	5	3	0	0	0	0	0	0	0	1	0
	2	1	1	0	0	0	0	0	0	0	0	0	0
	3	3	2	0	0	0	0	1	0	0	0	0	0
	4	11	5	0	0	3	0	0	0	0	2	0	1
	5	1	1	0	0	0	0	0	0	0	0	0	0
	TOTAL	58	26	4	0	4	1	1	0	0	3	16	3
AR	0	7	3	0	0	2	0	0	0	0	0	2	0
	1	1	1	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	4	1	0	0	0	0	0	0	0	0	3	0
	4	3	2	0	0	1	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	15	7	0	0	3	0	0	0	0	0	5	0

Table B.1.--(cont.). RPA public comment on APD's by respondent category

STATE CODE	APD CODE	TOTAL NO.	RESPONDENT CATEGORY										
			A	B	C	D	E	F	G	H	I	J	K
CA	0	125	83	12	2	9	2	4	0	0	4	6	3
	1	57	50	2	1	0	1	2	0	0	1	0	0
	2	4	4	0	0	0	0	0	0	0	0	0	0
	3	41	32	2	0	0	2	2	0	0	2	0	1
	4	29	20	1	0	6	0	0	1	0	0	1	0
	5	12	8	1	1	0	0	1	0	0	1	0	0
	TOTAL	268	197	18	4	15	5	9	1	0	8	7	4
CO	0	20	9	6	0	2	0	0	0	0	0	1	2
	1	5	2	3	0	0	0	0	0	0	0	0	0
	2	1	1	0	0	0	0	0	0	0	0	0	0
	3	4	2	1	0	0	0	0	0	0	0	1	0
	4	5	3	0	0	2	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	35	17	10	0	4	0	0	0	0	0	2	2
CT	0	5	3	1	0	0	0	0	0	0	0	0	1
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	1	1	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0
	4	1	1	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	7	5	1	0	0	0	0	0	0	0	0	1
DE	0	2	0	0	0	0	0	0	0	0	0	2	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	2	0	0	0	0	0	0	0	0	0	2	0
DC	0	20	1	7	0	5	0	0	0	2	0	0	5
	1	2	0	1	0	1	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	22	1	8	0	6	0	0	0	2	0	0	5

Table B.1.--(cont.). RPA public comment on APD's by respondent category

STATE CODE FL	APD CODE	TOTAL NO.	RESPONDENT CATEGORY										
			A	B	C	D	E	F	G	H	I	J	K
FL	0	6	4	0	0	1	0	0	0	0	0	1	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0
	4	1	0	0	0	1	0	0	0	0	0	0	0
	5	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	7	4	0	0	2	0	0	0	0	0	1	0
GA	0	9	3	3	0	0	0	0	0	0	0	1	2
	1	1	1	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	3	1	1	0	0	0	0	0	0	0	0	1
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	13	5	4	0	0	0	0	0	0	0	1	3
HI	0	8	4	0	0	0	0	0	1	0	0	1	2
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	1	0	0	0	0	0	0	1	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	9	4	0	0	0	0	0	2	0	0	1	2
ID	0	36	15	14	2	4	0	0	0	0	0	1	0
	1	11	9	1	0	1	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	7	5	1	0	0	0	0	0	0	0	1	0
	4	11	5	0	1	2	0	0	0	0	0	3	0
	5	<u>9</u>	<u>4</u>	<u>4</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	74	38	20	4	7	0	0	0	0	0	5	0
IL	0	20	10	5	0	0	0	1	0	0	1	3	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	4	2	2	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	25	13	7	0	0	0	1	0	0	1	3	0

Table B.1.--(cont.). RPA public comment on APD's by respondent category

STATE CODE IN	APD CODE	TOTAL NO.	RESPONDENT CATEGORY										
			A	B	C	D	E	F	G	H	I	J	K
	0	9	6	0	0	1	0	0	0	0	0	2	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	4	4	0	0	0	0	0	0	0	0	0	0
	3	1	0	1	0	0	0	0	0	0	0	0	0
	4	3	3	0	0	0	0	0	0	0	0	0	0
	5	1	1	0	0	0	0	0	0	0	0	0	0
	TOTAL	18	14	1	0	1	0	0	0	0	0	2	0
IA	0	3	1	0	0	0	0	0	0	0	0	1	1
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	1	1	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	4	2	0	0	0	0	0	0	0	0	1	1
KS	0	2	0	0	0	0	0	0	0	0	0	2	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	1	1	0	0	0	0	0	0	0	0	0	0
	TOTAL	3	1	0	0	0	0	0	0	0	0	2	0
KY	0	3	0	0	0	0	0	0	0	0	0	2	1
	1	1	1	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	1	0	0	0	0	0	0	0	0	0	1	0
	4	2	1	0	0	0	0	0	0	0	0	1	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	7	2	0	0	0	0	0	0	0	0	4	1
LA	0	1	0	0	0	0	0	0	0	0	0	1	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	1	1	0	0	0	0	0	0	0	0	0	0
	4	1	1	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	3	2	0	0	0	0	0	0	0	0	1	0

Table B.1.--(cont.). RPA public comment on APD's by respondent category

STATE CODE ME	APD CODE	TOTAL NO.	RESPONDENT CATEGORY										
			A	B	C	D	E	F	G	H	I	J	K
	0	4	2	1	0	0	0	0	0	0	0	1	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	1	1	0	0	0	0	0	0	0	0	0	0
	4	1	0	0	0	0	0	0	0	0	0	1	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	6	3	1	0	0	0	0	0	0	0	2	0
MD	0	3	1	1	0	0	0	0	0	0	0	1	0
	1	1	0	1	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	3	2	1	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	7	3	3	0	0	0	0	0	0	0	1	0
MA	0	2	1	0	1	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	1	1	0	0	0	0	0	0	0	0	0	0
	3	1	1	0	0	0	0	0	0	0	0	0	0
	4	3	1	0	0	1	1	0	0	0	0	0	0
	5	1	0	0	0	1	0	0	0	0	0	0	0
	TOTAL	8	4	0	1	2	1	0	0	0	0	0	0
MI	0	8	8	0	0	0	0	0	0	0	0	0	0
	1	1	1	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	3	2	0	0	0	0	0	0	0	0	1	0
	4	4	4	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	16	15	0	0	0	0	0	0	0	0	1	0
MN	0	11	9	1	0	0	1	0	0	0	0	0	0
	1	3	2	0	0	0	0	0	0	0	0	1	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	3	3	0	0	0	0	0	0	0	0	0	0
	4	3	0	0	0	0	0	0	0	0	0	0	0
	5	1	1	0	0	0	0	0	0	0	0	0	0
	TOTAL	21	15	1	0	1	1	0	0	0	0	3	0

Table B.1.--(cont.). RPA public comment on APD's by respondent category

STATE CODE MS	APD CODE	TOTAL NO.	RESPONDENT CATEGORY										
			A	B	C	D	E	F	G	H	I	J	K
MS	0	2	2	0	0	0	0	0	0	0	0	0	0
	1	1	0	0	0	0	0	0	0	0	0	1	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	1	0	0	0	0	0	0	0	0	0	1	0
	TOTAL	4	2	0	0	0	0	0	0	0	0	2	0
MO	0	15	11	0	0	1	0	0	0	0	0	3	0
	1	1	0	1	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	3	3	0	0	0	0	0	0	0	0	0	0
	4	3	2	0	0	0	0	0	0	0	0	0	1
	5	1	0	1	0	0	0	0	0	0	0	0	0
	TOTAL	23	16	2	0	1	0	0	0	0	0	3	1
MT	0	43	26	4	2	7	0	0	0	0	0	2	2
	1	8	6	2	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	14	10	2	1	0	0	1	0	0	0	0	0
	4	15	11	0	0	3	0	1	0	0	0	0	0
	5	1	1	0	0	0	0	0	0	0	0	0	0
	TOTAL	81	54	8	3	10	0	2	0	0	0	2	2
NE	0	3	1	0	0	0	0	0	0	0	0	1	1
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	1	0	0	0	0	0	0	1	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	4	1	0	0	0	0	0	1	0	0	1	1
NV	0	22	13	4	0	1	0	0	0	0	0	1	3
	1	3	1	1	0	0	0	0	0	0	0	1	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	7	6	0	0	0	0	0	0	0	0	1	0
	4	1	1	0	0	0	0	0	0	0	0	0	0
	5	3	3	0	0	0	0	0	0	0	0	0	0
	TOTAL	36	24	5	0	1	0	0	0	0	0	3	3

Table B.1.--(cont.). RPA public comment on APD's by respondent category

STATE CODE NH	APD CODE	TOTAL NO.	RESPONDENT CATEGORY										
			A	B	C	D	E	F	G	H	I	J	K
	0	3	2	0	0	0	0	0	0	0	1	0	0
	1	1	0	1	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	1	1	0	0	0	0	0	0	0	0	0	0
	4	3	2	0	0	0	0	0	0	0	0	1	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	8	5	1	0	0	0	0	0	0	1	1	0
NJ	0	2	1	0	0	0	0	0	0	0	0	1	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0
	4	2	1	0	0	0	0	0	0	0	0	1	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	4	2	0	0	0	0	0	0	0	0	2	0
NM	0	27	15	3	0	3	0	0	0	0	0	4	2
	1	4	3	1	0	0	0	0	0	0	0	0	0
	2	1	1	0	0	0	0	0	0	0	0	0	0
	3	9	3	0	0	0	0	0	0	0	1	3	2
	4	8	4	0	0	2	1	0	0	0	0	0	1
	5	1	1	0	0	0	0	0	0	0	0	0	0
	TOTAL	50	27	4	0	5	1	0	0	0	1	7	5
NY	0	5	4	0	0	0	0	0	0	0	0	1	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	1	1	0	0	0	0	0	0	0	0	0	0
	3	4	2	2	0	0	0	0	0	0	0	0	0
	4	4	3	0	0	0	0	0	0	0	0	1	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	14	10	2	0	0	0	0	0	0	0	2	0
NC	0	4	2	0	0	0	0	0	0	0	0	2	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0
	4	1	1	0	0	0	0	0	0	0	0	0	0
	5	1	1	0	0	0	0	0	0	0	0	0	0
	TOTAL	6	4	0	0	0	0	0	0	0	0	2	0

Table B.1.--(cont.). RPA public comment on APD's by respondent category

STATE CODE ND	APD CODE	TOTAL NO.	RESPONDENT CATEGORY										
			A	B	C	D	E	F	G	H	I	J	K
	0	1	0	1	0	0	0	0	0	0	0	0	0
	1	0	0	0	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	2	0	1	0	0	0	0	0	0	0	1	0
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	<u>2</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	5	1	3	0	0	0	0	0	0	0	1	0
OH	0	4	2	1	0	0	0	0	0	0	0	1	0
	1	1	0	1	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	1	0	1	0	0	0	0	0	0	0	0	0
	4	2	2	0	0	0	0	0	0	0	0	0	0
	5	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	8	4	3	0	0	0	0	0	0	0	1	0
OK	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0
	4	2	1	0	0	0	0	0	0	0	0	1	0
	5	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	2	1	0	0	0	0	0	0	0	0	1	0
OR	0	125	97	23	0	2	0	0	1	0	0	1	1
	1	18	6	8	0	1	0	0	0	0	2	0	1
	2	3	2	0	0	1	0	0	0	0	0	0	0
	3	17	15	0	2	0	0	0	0	0	0	0	0
	4	9	8	0	0	1	0	0	0	0	0	0	0
	5	<u>2</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	174	130	31	2	5	0	0	1	0	2	1	2
PA	0	10	8	0	0	0	0	0	0	0	0	2	0
	1	3	3	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	2	1	1	0	0	0	0	0	0	0	0	0
	4	1	1	0	0	0	0	0	0	0	0	0	0
	5	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	16	13	1	0	0	0	0	0	0	0	2	0

Table B.1.--(cont.). RPA public comment on APD's by respondent category

STATE CODE PR	APD CODE	TOTAL NO.	RESPONDENT CATEGORY										
			A	B	C	D	E	F	G	H	I	J	K
PR	0	1	0	0	0	0	0	0	0	0	0	1	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	1	0	0	0	0	0	0	0	0	0	1	0
RI	0	1	0	0	0	0	0	0	0	0	0	1	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	1	0	0	0	0	0	0	0	0	0	1	0
SC	0	4	2	0	0	0	0	0	0	0	0	2	0
	1	2	0	1	0	0	0	0	0	0	0	1	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	4	3	0	0	0	0	0	0	0	0	1	0
	4	2	2	0	0	0	0	0	0	0	0	0	0
	5	1	1	0	0	0	0	0	0	0	0	0	0
	TOTAL	13	8	1	0	0	0	0	0	0	0	4	0
SD	0	4	0	0	0	1	0	1	0	0	0	2	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	4	3	0	0	0	0	0	0	0	0	1	0
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	8	3	0	0	1	0	1	0	0	0	3	0
TN	0	6	4	0	0	0	0	0	0	0	0	2	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0
	4	3	2	0	0	1	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	9	6	0	0	1	0	0	0	0	0	2	0

Table B.1.--(cont.). RPA public comment on APD's by respondent category

STATE CODE	APD CODE	TOTAL NO.	RESPONDENT CATEGORY										
			A	B	C	D	E	F	G	H	I	J	K
TX	0	6	2	0	0	2	0	0	0	0	0	1	1
	1	1	0	0	0	0	0	0	0	0	0	1	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	3	0	0	0	1	0	0	0	0	0	2	0
	4	5	3	0	0	2	1	0	0	0	0	0	1
	5	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	15	5	0	0	5	0	0	0	0	0	4	1
UT	0	16	10	2	0	0	0	0	1	0	0	1	2
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	7	5	0	0	0	0	2	0	0	0	0	0
	4	2	2	0	0	0	0	0	0	0	0	0	0
	5	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	26	18	2	0	0	0	2	1	0	0	1	2
VT	0	1	1	0	0	0	0	0	0	0	0	0	0
	1	1	1	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0	0	0	0	0
	4	1	1	0	0	0	0	0	0	0	0	0	0
	5	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	3	3	0	0	0	0	0	0	0	0	0	0
VA	0	10	9	0	0	0	0	0	0	0	0	1	0
	1	2	0	0	0	0	0	0	0	0	0	2	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	6	4	0	0	0	0	0	0	0	1	1	0
	4	6	6	0	0	0	0	0	0	0	0	0	0
	5	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	24	19	0	0	0	0	0	0	0	1	4	0
WA	0	107	89	6	0	5	0	0	2	1	1	2	1
	1	12	8	2	1	0	0	1	0	0	0	0	0
	2	3	2	0	0	1	0	0	0	0	0	0	0
	3	6	6	0	0	0	0	0	0	0	0	0	0
	4	12	9	0	0	2	0	0	0	0	0	1	0
	5	<u>5</u>	<u>4</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	145	118	8	1	9	0	1	2	1	1	3	1

Table B.1.--(cont.). RPA public comment on APD's by respondent category

STATE CODE WV	APD CODE	TOTAL NO.	RESPONDENT CATEGORY										
			A	B	C	D	E	F	G	H	I	J	K
	0	8	5	0	0	0	2	0	0	0	0	1	0
	1	2	2	0	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0	0	0	0
	3	1	1	0	0	0	0	0	0	0	0	0	0
	4	3	1	0	0	2	0	0	0	0	0	0	0
	5	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	14	9	0	0	2	2	0	0	0	0	1	0
WI	0	18	13	4	0	0	0	0	0	0	0	1	0
	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	1	1	0	0	0	0	0	0	0	0	0	0
	3	4	2	2	0	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0	0	0	0	0
	5	<u>2</u>	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	25	18	6	0	0	0	0	0	0	0	1	0
WY	0	5	3	1	0	0	0	0	0	0	0	0	1
	1	1	0	0	0	0	0	1	0	0	0	0	0
	2	1	1	0	0	0	0	0	0	0	0	0	0
	3	2	2	0	0	0	0	0	0	0	0	0	0
	4	2	2	0	0	0	0	0	0	0	0	0	0
	5	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
	TOTAL	11	8	1	0	0	0	1	0	0	0	0	1
SUMMARY	0	860	548	110	7	51	6	6	5	3	8	81	35
	1	265	204	35	3	3	2	5	0	0	4	8	1
	2	40	38	0	0	2	0	0	0	0	0	0	0
	3	217	156	20	4	1	2	6	2	0	4	17	5
	4	206	146	3	1	30	3	1	1	0	2	13	6
	5	<u>58</u>	<u>42</u>	<u>7</u>	<u>2</u>	<u>2</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>1</u>
	TOTAL	1646	1134	175	17	89	13	19	9	3	19	120	48

Table B.2 --RPA public comment that supported modification,
by respondent category

STATE CODE	TOTAL NO.	RESPONDENT CATEGORY										
		A	B	C	D	E	F	G	H	I	J	K
	11	10	0	0	0	0	0	0	0	0	0	1
AL	1	0	1	0	0	0	0	0	0	0	0	0
AK	25	13	7	0	4	0	0	0	0	0	1	0
AZ	8	7	0	0	1	0	0	0	0	0	0	0
AR	3	2	0	0	1	0	0	0	0	0	0	0
CA	61	42	5	1	6	0	3	0	0	2	2	0
CO	8	4	2	0	2	0	0	0	0	0	0	0
DC	6	0	2	0	3	0	0	0	0	0	0	1
FL	2	0	0	0	1	0	0	0	0	0	1	0
GA	5	1	3	0	0	0	0	0	0	0	0	1
HI	1	1	0	0	0	0	0	0	0	0	0	0
ID	19	6	8	1	4	0	0	0	0	0	0	0
IL	7	3	3	0	0	0	0	0	0	0	1	0
IN	1	0	0	0	1	0	0	0	0	0	0	0
KS	1	1	0	0	0	0	0	0	0	0	0	0
KY	2	0	0	0	0	0	0	0	0	0	1	1
LA	1	0	0	0	0	0	0	0	0	0	1	0
ME	1	1	0	0	0	0	0	0	0	0	0	0
MD	2	1	0	0	0	0	0	0	0	0	1	0
MI	3	3	0	0	0	0	0	0	0	0	0	0
MN	1	0	1	0	0	0	0	0	0	0	0	0
MS	1	1	0	0	0	0	0	0	0	0	0	0
MO	6	6	0	0	0	0	0	0	0	0	0	0
MT	20	14	1	0	4	0	0	0	0	0	1	0
NV	16	12	2	0	0	0	0	0	0	0	2	0
NM	10	8	2	0	0	0	0	0	0	0	0	0
NY	2	1	0	0	0	0	0	0	0	0	1	0
OR	17	6	7	0	2	0	0	1	0	0	1	0
PA	1	0	0	0	0	0	0	0	0	0	1	0
SC	3	1	0	0	0	0	0	0	0	0	2	0
SD	1	0	0	0	1	0	0	0	0	0	0	0
TN	4	2	0	0	0	0	0	0	0	0	2	0
TX	1	0	0	0	1	0	0	0	0	0	0	0
UT	5	3	0	0	0	0	0	1	0	0	1	0
VT	1	1	0	0	0	0	0	0	0	0	0	0
VA	2	2	0	0	0	0	0	0	0	0	0	0
WA	10	6	2	0	0	0	0	1	0	0	1	0
WV	2	1	0	0	0	1	0	0	0	0	0	0
WI	8	4	4	0	0	0	0	0	0	0	0	0
TOTAL	279	163	50	2	31	1	3	3	0	2	20	4

Table B.3.--RPA public comment on policy issues, by respondent category

STATE CODE	TOTAL NO.	RESPONDENT CATEGORY										
		A	B	C	D	E	F	G	H	I	J	K
	30	26	0	1	0	1	0	0	0	0	1	1
AL	1	1	0	0	0	0	0	0	0	0	0	0
AK	41	34	3	0	1	0	0	0	0	0	0	3
AZ	16	10	2	0	1	0	0	0	0	0	1	2
AR	9	4	0	0	1	0	0	0	0	0	4	0
CA	174	130	12	4	10	4	5	1	0	4	4	0
CO	19	8	6	0	3	0	0	0	0	0	1	1
CT	2	2	0	0	0	0	0	0	0	0	0	0
DE	1	0	0	0	0	0	0	0	0	0	1	0
DC	11	0	4	0	5	0	0	0	1	0	0	1
FL	3	1	0	0	1	0	0	0	0	0	1	0
GA	5	3	1	0	0	0	0	0	0	0	0	1
HI	5	3	0	0	0	0	0	2	0	0	0	0
ID	30	15	9	1	5	0	0	0	0	0	0	0
IL	11	7	2	0	0	0	1	0	0	0	1	0
IN	8	5	1	0	1	0	0	0	0	0	1	0
IA	3	2	0	0	0	0	0	0	0	0	1	0
KS	2	0	0	0	0	0	0	0	0	0	2	0
KY	5	2	0	0	0	0	0	0	0	0	2	1
LA	2	1	0	0	0	0	0	0	0	0	1	0
ME	4	2	1	0	0	0	0	0	0	0	1	0
MD	4	2	1	0	0	0	0	0	0	0	1	0
MA	5	1	0	1	2	1	0	0	0	0	0	0
MI	10	9	0	0	0	0	0	0	0	0	1	0
MN	13	9	0	0	1	1	0	0	0	0	2	0
MS	2	1	0	0	0	0	0	0	0	0	1	0
MO	13	7	2	0	1	0	0	0	0	0	2	1
MT	45	27	6	3	7	0	1	0	0	0	1	0
NV	24	18	4	0	0	0	0	0	0	0	2	0
NH	4	1	1	0	0	0	0	0	0	1	1	0
NJ	2	1	0	0	0	0	0	0	0	0	1	0
NM	21	12	1	0	3	0	0	0	0	0	3	2
NY	4	3	0	0	0	0	0	0	0	0	1	0
NC	4	3	0	0	0	0	0	0	0	0	1	0
ND	2	0	1	0	0	0	0	0	0	0	1	0
OH	4	2	1	0	0	0	0	0	0	0	1	0
OR	109	96	6	0	3	0	0	1	0	2	1	0
PA	13	10	1	0	0	0	0	0	0	0	2	0
RI	1	0	0	0	0	0	0	0	0	0	1	0
SC	10	5	1	0	0	0	0	0	0	0	4	0
SD	1	0	0	0	0	0	0	0	0	0	1	0
TN	6	4	0	0	1	0	0	0	0	0	1	0
TX	7	2	0	0	1	0	0	0	0	0	3	1
UT	11	8	2	0	0	0	0	0	0	0	1	0
VT	2	2	0	0	0	0	0	0	0	0	0	0
VA	15	13	0	0	0	0	0	0	0	0	2	0
WA	103	92	0	1	7	0	0	1	0	0	1	1

Table B.3.--(cont.). RPA public comment on policy issues, by respondent category

STATE CODE	TOTAL NO.	RESPONDENT CATEGORY										
		A	B	C	D	E	F	G	H	I	J	K
WV	10	5	0	0	2	2	0	0	0	0	1	0
WI	9	8	1	0	0	0	0	0	0	0	0	0
WY	4	3	0	0	0	0	1	0	0	0	0	0
TOTAL	840	600	69	11	56	9	8	5	1	7	59	15

Table B.4.--RPA public comment on supply and demand criteria, by respondent category

STATE CODE	TOTAL NO.	RESPONDENT CATEGORY										
		A	B	C	D	E	F	G	H	I	J	K
	16	14	0	0	0	1	0	0	0	0	0	1
AL	1	1	0	0	0	0	0	0	0	0	0	0
AK	9	8	1	0	0	0	0	0	0	0	0	0
AZ	12	7	3	0	1	0	0	0	0	0	0	1
AR	2	1	0	0	1	0	0	0	0	0	0	0
CA	99	69	8	3	5	2	4	0	0	5	2	1
CO	14	7	3	0	3	0	0	0	0	0	0	1
CT	1	1	0	0	0	0	0	0	0	0	0	0
DC	11	0	4	0	6	0	0	0	0	0	0	1
FL	1	1	0	0	0	0	0	0	0	0	0	0
GA	4	1	2	0	0	0	0	0	0	0	0	1
HI	2	1	0	0	0	0	0	1	0	0	0	0
ID	26	15	8	0	2	0	0	0	0	0	1	0
IL	6	3	1	0	0	0	0	0	0	1	1	0
IN	2	2	0	0	0	0	0	0	0	0	0	0
IA	1	0	0	0	0	0	0	0	0	0	1	0
KS	1	1	0	0	0	0	0	0	0	0	0	0
KY	4	1	0	0	0	0	0	0	0	0	2	1
LA	2	1	0	0	0	0	0	0	0	0	1	0
ME	1	0	0	0	0	0	0	0	0	0	1	0
MD	2	2	0	0	0	0	0	0	0	0	0	0
MI	4	3	0	0	0	0	0	0	0	0	1	0
MN	4	2	0	0	0	1	0	0	0	0	1	0
MS	1	1	0	0	0	0	0	0	0	0	0	0
MO	2	2	0	0	0	0	0	0	0	0	0	0
MT	41	27	5	1	5	0	1	0	0	0	1	1
NE	1	0	0	0	0	0	0	1	0	0	0	0
NV	14	6	4	0	0	0	0	0	0	0	2	2
NH	1	0	0	0	0	0	0	0	0	0	1	0
NJ	1	1	0	0	0	0	0	0	0	0	0	0
NM	16	9	2	0	2	0	0	0	0	0	1	2
NY	2	0	1	0	0	0	0	0	0	0	1	0
NC	2	2	0	0	0	0	0	0	0	0	0	0
ND	2	0	1	0	0	0	0	0	0	0	1	0
OR	37	12	18	0	3	0	0	1	0	2	1	0
PA	4	3	0	0	0	0	0	0	0	0	1	0
SC	5	2	1	0	0	0	0	0	0	0	2	0
SD	3	2	0	0	0	0	0	0	0	0	1	0
TN	3	3	0	0	0	0	0	0	0	0	0	0
TX	2	1	0	0	0	0	0	0	0	0	1	0
UT	11	9	1	0	0	0	0	0	0	0	1	0
VT	1	1	0	0	0	0	0	0	0	0	0	0
VA	4	4	0	0	0	0	0	0	0	0	0	0
WA	25	14	1	1	6	0	0	1	0	0	2	0
WV	2	1	0	0	0	1	0	0	0	0	0	0
WI	6	6	0	0	0	0	0	0	0	0	0	0
WY	4	3	1	0	0	0	0	0	0	0	0	0
TOTAL	416	250	66	5	34	5	5	4	0	8	27	12

Table B.5.--RPA public comment on decision criteria, by respondent category

STATE CODE	TOTAL NO.	RESPONDENT CATEGORY										
		A	B	C	D	E	F	G	H	I	J	K
	4	3	0	0	0	1	0	0	0	0	0	0
AL	2	1	1	0	0	0	0	0	0	0	0	0
AK	21	16	3	0	0	1	0	0	0	0	0	1
AZ	4	3	1	0	0	0	0	0	0	0	0	0
AR	3	3	0	0	0	0	0	0	0	0	0	0
CA	63	49	6	0	2	1	3	0	0	1	1	0
CO	4	3	0	0	1	0	0	0	0	0	0	0
CT	1	1	0	0	0	0	0	0	0	0	0	0
DE	1	0	0	0	0	0	0	0	0	0	1	0
DC	5	0	1	0	3	0	0	0	0	0	0	1
FL	2	1	0	0	0	0	0	0	0	0	1	0
GA	6	2	2	0	0	0	0	0	0	0	1	1
HI	1	0	0	0	0	0	0	0	0	0	0	1
ID	11	8	2	0	1	0	0	0	0	0	0	0
IL	2	1	0	0	0	0	0	0	0	1	0	0
KS	1	0	0	0	0	0	0	0	0	0	1	0
KY	2	0	0	0	0	0	0	0	0	0	1	1
LA	2	1	0	0	0	0	0	0	0	0	1	0
ME	3	1	0	0	0	0	0	0	0	0	2	0
MD	1	1	0	0	0	0	0	0	0	0	0	0
MA	1	0	0	0	1	0	0	0	0	0	0	0
MI	1	1	0	0	0	0	0	0	0	0	0	0
MN	5	3	0	0	0	0	0	0	0	0	2	0
MS	1	1	0	0	0	0	0	0	0	0	0	0
MT	10	8	1	0	0	0	1	0	0	0	0	0
NE	1	0	0	0	0	0	0	1	0	0	0	0
NV	10	6	2	0	0	0	0	0	0	0	1	1
NM	10	7	0	0	0	0	0	0	0	0	1	2
NC	3	2	0	0	0	0	0	0	0	0	1	0
OH	1	1	0	0	0	0	0	0	0	0	0	0
OR	6	0	2	0	1	0	0	1	0	1	1	0
PA	5	4	0	0	0	0	0	0	0	0	1	0
RI	1	0	0	0	0	0	0	0	0	0	1	0
SC	5	3	1	0	0	0	0	0	0	0	1	0
TN	1	1	0	0	0	0	0	0	0	0	0	0
UT	6	4	1	0	0	0	0	0	0	0	1	0
VT	2	2	0	0	0	0	0	0	0	0	0	0
VA	6	6	0	0	0	0	0	0	0	0	0	0
WA	11	7	0	1	2	0	0	0	0	0	1	0
WV	2	2	0	0	0	0	0	0	0	0	0	0
WI	3	3	0	0	0	0	0	0	0	0	0	0
TOTAL	230	155	23	1	11	3	4	2	0	3	20	8

Table B.6.--RPA public comment on the draft documents, by respondent category

STATE CODE	TOTAL NO.	RESPONDENT CATEGORY										
		A	B	C	D	E	F	G	H	I	J	K
	12	10	0	0	0	1	0	0	0	0	1	0
AK	42	28	5	0	3	0	0	0	0	0	3	3
AZ	16	9	1	0	3	0	0	0	0	0	2	1
AR	4	2	0	0	1	0	0	0	0	0	1	0
CA	82	52	7	3	9	1	2	1	0	3	4	0
CO	17	8	6	0	0	0	0	0	0	0	1	2
CT	3	2	1	0	0	0	0	0	0	0	0	0
DE	1	0	0	0	0	0	0	0	0	0	1	0
DC	11	0	5	0	3	0	0	0	1	0	0	2
FL	4	2	0	0	1	0	0	0	0	0	1	0
GA	6	3	3	0	0	0	0	0	0	0	0	0
HI	6	4	0	0	0	0	0	1	0	0	0	1
ID	27	13	10	0	2	0	0	0	0	0	2	0
IL	8	4	1	0	0	0	0	0	0	1	2	0
IN	5	2	1	0	0	0	0	0	0	0	2	0
IA	2	0	0	0	0	0	0	0	0	0	1	1
KS	2	1	0	0	0	0	0	0	0	0	1	0
KY	1	0	0	0	0	0	0	0	0	0	1	0
LA	1	1	0	0	0	0	0	0	0	0	0	0
ME	3	1	1	0	0	0	0	0	0	0	1	0
MD	5	2	2	0	0	0	0	0	0	0	1	0
MA	1	1	0	0	0	0	0	0	0	0	0	0
MI	2	1	0	0	0	0	0	0	0	0	1	0
MN	7	5	0	0	0	1	0	0	0	0	1	0
MO	4	2	1	0	1	0	0	0	0	0	0	0
MT	22	11	4	0	4	0	1	0	0	0	1	1
NE	1	1	0	0	0	0	0	0	0	0	0	0
NV	11	7	1	0	1	0	0	0	0	0	1	1
NH	5	3	0	0	0	0	0	0	0	1	1	0
NJ	3	1	0	0	0	0	0	0	0	0	2	0
NM	19	7	4	0	2	1	0	0	0	0	2	3
NY	1	0	0	0	0	0	0	0	0	0	1	0
NC	4	2	0	0	0	0	0	0	0	0	2	0
ND	2	0	1	0	0	0	0	0	0	0	1	0
OH	4	2	1	0	0	0	0	0	0	0	1	0
OK	2	1	0	0	0	0	0	0	0	0	1	0
OR	39	11	22	0	4	0	0	0	0	1	1	0
PA	6	4	1	0	0	0	0	0	0	0	1	0
PR	1	0	0	0	0	0	0	0	0	0	1	0
SC	5	2	0	0	0	0	0	0	0	0	3	0
SD	2	1	0	0	0	0	0	0	0	0	1	0
TN	3	2	0	0	0	0	0	0	0	0	1	0
TX	6	2	0	0	3	0	0	0	0	0	1	0
UT	10	9	0	0	0	0	0	0	0	0	1	0
VA	8	6	0	0	0	0	0	0	0	0	2	0
WA	31	14	3	1	6	0	0	2	1	1	2	1

Table B.6.--(cont.). RPA public comment on the draft documents,
by respondent category

STATE CODE	TOTAL NO.	RESPONDENT CATEGORY										
		A	B	C	D	E	F	G	H	I	J	K
WV	3	2	0	0	0	0	0	0	0	0	1	0
WI	15	10	4	0	0	0	0	0	0	0	1	0
WY	3	2	0	0	0	0	1	0	0	0	0	0
TOTAL	478	253	85	4	43	4	4	4	2	7	56	16

Table B.7.--RPA public comment on the public involvement process,
by respondent category

STATE CODE	TOTAL NO.	RESPONDENT CATEGORY										
		A	B	C	D	E	F	G	H	I	J	K
	7	7	0	0	0	0	0	0	0	0	0	0
AL	2	1	1	0	0	0	0	0	0	0	0	0
AK	7	7	0	0	0	0	0	0	0	0	0	0
AZ	4	2	1	0	0	0	0	0	0	0	1	0
CA	37	19	7	2	6	1	0	0	0	1	1	0
CO	7	5	2	0	0	0	0	0	0	0	0	0
DC	7	0	1	0	4	0	0	0	1	0	0	1
ID	11	2	8	0	1	0	0	0	0	0	0	0
IL	1	1	0	0	0	0	0	0	0	0	0	0
ME	1	1	0	0	0	0	0	0	0	0	0	0
MA	2	0	0	0	1	1	0	0	0	0	0	0
MI	3	3	0	0	0	0	0	0	0	0	0	0
MN	3	2	0	0	0	1	0	0	0	0	0	0
MT	10	5	0	0	3	0	1	0	0	0	2	1
NV	3	2	1	0	0	0	0	0	0	0	0	0
NH	1	0	0	0	0	0	0	0	0	1	0	0
NM	2	2	0	0	0	0	0	0	0	0	0	0
ND	1	0	1	0	0	0	0	0	0	0	0	0
OR	21	5	14	0	1	0	0	0	0	1	0	0
	1	0	0	0	0	0	1	0	0	0	0	0
VT	3	2	1	0	0	0	0	0	0	0	0	0
VA	1	1	0	0	0	0	0	0	0	0	0	0
WA	13	8	1	0	2	0	0	0	1	0	1	0
WV	2	2	0	0	0	0	0	0	0	0	0	0
TOTAL	152	77	38	2	18	3	2	0	2	3	5	2

SUMMARIES OF RESPONSES

Summary of Respondent Support or Dislike of Alternative Program Directions

APD 1

Support.--In order to meet future demands from the limited land base, and with the need for environmental protection, intensive multiple use management is necessary for State and private forest and range lands and the National Forests, with full research support.

Dislikes.--Unacceptable because of high cost and low benefit-cost ratio, expected high energy needs, and negative impacts on the environment and resources. It is not feasible to have more of everything, and it is unrealistic to make such an investment during the present economic climate.

APD 2

Support.--Low investment level is best to protect the environment while providing the greatest return on investments.

Dislikes.--It fails to meet the minimum land stewardship. Low, unacceptable levels of commodities, amenities and research will lead to high prices and serious long-term degradation of the environment.

APD 3

Support.--A moderate program is reasonable because it is cost-effective and provides a balanced combination of resource management, Research, and State and Private Forestry.

Dislikes.--Too costly for the low benefits produced. It does not provide for adequate increases in State and Private Forestry assistance, timber, range and wildlife management, and wilderness. Timber goals, and others, are lower than those of the 1975 RPA program.

APD 4

Support.--Market production shifted to non-Federal lands is desirable. Amenities such as wilderness and wildlife are more appropriately emphasized on the National Forests.

Dislikes.--Presents an unrealistic shift of market production to the private sector. It underutilizes the National Forest potential and could create serious economic hardship for dependent communities.

APD 5

Support.--Adequate commodity and noncommodity uses are provided at a reasonable investment. This is the current approach, is most appropriate, and is in line with present management and funding constraints.

Dislikes.--The program direction is "business as usual," and lacks concern for nonmarket resources from National Forest lands. Fails to emphasize the production of commodities from non-Federal lands.

Argumentation by Respondent Categories for APD's

APD 1

A.--Provides for future supply-demand requirements in a cost-effective manner by maximizing market and nonmarket outputs while protecting the environment. (Refer to page B-18; letters A through K identify categories of responders.)

B.--Provides for greatest monetary returns to the U.S. Treasury while providing necessary raw material to industry, thereby maintaining economies. Offers strong research and technical assistance to complement industry involved in resource development of Federal and non-Federal lands. Provides for future supply-demand requirements, in a cost-effective manner, on a shrinking resource base.

C.--Promotes intensive NFS recreational use where cost effective, strengthens local economies and provides improved employment opportunities. Encourages private recreation investors on adjacent lands and maximizes outputs from non-Federal lands.

D.--Provides long-term market and nonmarket outputs.

E.--Sustains jobs by development of resources and maximizes energy development.

F.--Maintains current tax bases and employment levels while providing for future supply-demand requirements, through high market and nonmarket outputs.

I.--Benefits local economies while meeting future supply-demand requirements.

J.--Provides for intensive resource development in a businesslike manner. Supports multiple-use concept by high outputs of market and nonmarket resources while providing for environmental protection.

APD 2

A.--Minimizes adverse environmental impacts through minimal output levels. Places Forest Service in custodial role of resource management and provides the best benefit-cost ratio for return on the Federal dollar.

D.--Provides for natural environmental protection while emphasizing non-commodity goods and services.

J.--Emphasizes low levels of market-nonmarket outputs.

APD 3

A.--Noninflationary, best balance of all Forest Service programs and activities. Most affordable Alternative for providing needed goods and services under multiple-use concept. It increases the level of nonmarket outputs and reduces user conflicts. It maintains a stable social-economic situation, and provides environmental protection.

B.--Provides realistic goals for market and nonmarket production on all lands while providing adequate levels of research support. Provides the most flexibility to respond to changes in demand, at a reasonable cost. Increases range forage for livestock and wildlife.

C.--Supports recreation, allows off-road vehicle use and provides acceptable levels of wilderness with no reduction in timber harvest. Provides environmental protection.

D.--Keeps options open for additional wilderness designation by limiting road construction, and regulating ORV use. Increases market outputs from non-industrial private lands.

E.--Most reasonable, middle-of-road alternative.

F.--Moderate alternative which will provide acceptable balance of resource outputs with minimal adverse impacts on local economies. Multiple-use alternative with best chance of being funded.

G.--Provides reasonable balance between NFS and S&PF programs, and Research activities. Best balance between market and nonmarket outputs.

I.--Most prudent economic, political and social Alternative that will meet future demands for goods and services.

J. Efficient and cost-effective approach to meeting future needs for market and nonmarket outputs. Provides equitable distribution of resource outputs between public and private lands.

K.--Although costly, provides best mix of resource production with minimal environmental consequences.

APD 4

A.--Shifts emphasis of market resource production to private lands, allowing NFS lands to emphasize nonmarket production, especially wilderness and wildlife. Low-cost and increased Research programs provide benefits to citizens.

C.--Emphasizes nonmarket outputs on NFS land by shifting market output production to private lands.

D.--Nonmarket emphasis on NFS land ensures future resource bank by controlling insensitive development and commercialization. Market resource production emphasis on private lands forestalls conversion of nonindustrial private forest land to nonforest use. Maximizes amount of wilderness and provides greatest benefit to wildlife. Because of an increase in the role of S&PF, urban forestry will be integrated into total urban planning.

E.--Highest allocation to human and community development while emphasizing nonmarket values and intensive silvicultural practices.

G.--Enhances nonmarket outputs by reducing impacts of timber removal. Benefits fish and wildlife.

I.--Meets demands for recreation and wildlife while improving environmental quality.

J.--Considers environmental concerns while meeting demands for market outputs. Emphasizes greater S&PF role in providing assistance in market productions from non-Federal lands while emphasizing nonmarket resources on National Forest System lands. Provides greatest long-term resource protection.

K.--Emphasizes fish and wildlife habitat improvement, preserves wilderness, and increases recreational opportunities at a median cost.

ADP 5

A.--Maintains current Forest Service programs and activities at realistic costs. Maximizes sustained yield concept within the realities of politics and funding. Follows policy developed by experienced Forest Service personnel. By maintaining timber outputs at current levels, and by better utilizing wood, the environment will be protected.

B.--Current approach based on sound evaluation. Easily modified, good return to U.S. Treasury.

C.--Adequate level of S&PF and Research programs, provides services essential to public health and safety. Best levels of outputs and market resources emphasize recreation and environmental quality.

D.--Allows current programs to continue until population and energy situations are clearly assessed.

G.--Multiple use is favored.

Policy Issue 1: Production of Wood and Wood Products
from Nonindustrial Private Lands

Policy Question

Should Forest Service programs seek to correct market imperfections, remove other impediments to, and otherwise support development of wood production from nonindustrial private forest lands?

Analysis

Overwhelming majority of respondents favored option 4 which would expand cooperative Federal-State-local actions to improve nonindustrial private sector forest management through management assistance, financial incentives, research and information transfer. Some people preferred option 2, the current program level. A lesser number favored option 3, limiting Forest Service programs to removing market imperfections to more complete development of nonindustrial forest lands. Very few supported reduction of the present effort.

Individuals, nonmotorized/preservationist interest groups, State elected officials, State agencies, and Federal agencies emphasized that the greatest potential for increased timber supply is on private land; they concluded that: expanded cooperative efforts and funds should be provided through the States. Assistance should be long-term and include incentives so that private landowners can better compete in markets. All Forest Service Regions except Region 1 supported this option. The thrust of Region 1 respondents was to (a) leave private landowners alone or develop new ways of working with them, (b) provide opportunities to improve management practices, and (c) not attempt to correct current market imperfections.

Respondents in category B, commodity interest groups, were divided along geographic lines. In the West, respondents felt that private lands were an unreliable source of timber and therefore favored option 2, which would continue current program levels, emphasizing voluntary development of privately owned land and sustained yield forestry with Federal and State Government assistance in essential supplemental services. Eastern respondents preferred option 4 supporting category A majority rationale.

Civic interest groups (E) from California preferred noninterference by Federal Government in resource management on State, local, and private lands.

Category I respondents in the Northeast were equally divided in favor of options 2, 3, and 4. Some cited "Wood Resources Study" which recommends a larger Federal role (option 4), while others observed that current activities do not suggest that potential will develop (option 2).

1/ For each policy issue, several options for different policy direction were provided in detailed issue papers that are on file in the Forest Service, Washington Office.

Policy Issue 2: Level of Production of Wood and Wood Products from National Forest System Lands

Policy Questions

What cost-effective alternatives are available to increase production of wood and wood products from National Forest System lands within environmental and multiple-use constraints? How might such increased supplies slow long-term upward price trends?

Analysis

Respondents generally favored a modified combination of options 1 and 3, that is, to maintain the policy of nondeclining even-flow management with some acceleration in old-growth harvests. Most respondents felt that production could be increased by concentrating management on better sites. More attention should be paid to keeping the land in a productive condition, i.e., immediate replanting, etc. Most respondents supported these increases subject to multiple use and environmental constraints. Attention should be given to scheduling timber harvests to stabilize production and prices.

Policy Issue 3: Wood Fiber as an Energy Source

Policy Questions

What are cost-effective opportunities for development of wood fiber as an energy service? What might be a cost-effective role for the Forest Service in meeting such opportunities?

Analysis

Respondents generally favored developing management and technology transfer systems, and initiating more research leading to increased wood production and utilization of forest biomass to help meet energy needs. However, respondents agreed that adverse impacts on other forest values should be avoided.

Policy Issue 4: Utilization of Hardwoods

Policy Question

Should Forest Service programs place greater emphasis on management and utilization of hardwood timber supplies to help meet future total wood fiber demands?

Analysis

Respondents favored emphasis on research, education, and technical assistance to private landowners in management, harvesting, utilization, and marketing of hardwoods, especially low-grade hardwoods.

Policy Issue 5: Export and Import of Raw Logs

Policy Question

What is the impact of current National Forest timber sale export policy on national versus community welfare? In what ways should National Forest System timber sales be managed to affect log exports and/or imports? What would be the impact of feasible alternatives? What is the "impact of the export and import of raw logs upon domestic timber supply and prices?" (as quoted from RPA, Section 4(5) (e); 16 U.S.C. 1602)

Analysis

Respondents favored continuation of or increases in present restriction on logs exportation. They said: (1) Do not export logs during periods of peak domestic demand for wood products. (2) Encourage exporting finished wood products. (3) Work toward self-sufficiency by reducing dependency on imports.

Policy Issue 6: Herbicides in National Forest System Management

Policy Question

What should be Forest Service policy on use of herbicides for vegetation management on National Forest System Lands?

Analysis

Those respondents, primarily industry-oriented groups, favoring use of herbicides emphasize that safety and environmental protection are necessary. People opposing the use of herbicides or wanting restrictions emphasize that other methods of control, manual or biological, are preferable. More people favor using herbicides than banning them altogether (option 1).

Policy Issue 7: Pesticides in Forest and Range Lands Management

Policy Questions

What are the most cost-effective and environmentally acceptable policy alternatives for controlling losses due to insects, diseases, and other pests on forest and range lands? What should be Forest Service policies on pesticide research and on registration of pesticides?

Analysis

The majority of respondents favored option 1, which allows the use of EPA registered pesticides when cost effective and when proven to be absolutely necessary. They called for protection of air, water, soil and fauna from adverse effects of pesticides.

There was strong support for more research to develop safer pesticides and alternate pest control methods. Most respondents preferred biological control methods. A strong minority, particularly the preservation-oriented group, wanted to stop use of pesticides altogether.

Policy Issue 8: Consumer Payments for Nonmarket Goods and Services

Policy Question

Should users (beneficiaries) on National Forest System lands pay (all or some of) the costs of nonmarket goods and services produced by these lands?

Analysis

A large majority of respondents favored reasonable cost-based fees (option 3). Respondents said that fees do not necessarily need to equal costs but they should be more in line with costs than they are now. They recommended that fees collected be returned and used for the program that generated them. No major differences between respondent categories were noted.

Policy Issue 9: Alternative Means for Financing Capital Development on National Forest System Lands

Policy Question

What means are available (other than appropriations) for cost-effective financing of capital investments for development of National Forest System lands?

Analysis

Most respondent categories favored additional authorization to use receipts (option 3). Respondents generally encourage the use of private funds and National Forest System receipts for capital investments where cost effective. They recommended that National Forest System receipts be returned to the programs where they originated, but not that the Forest Service should lose or relinquish administrative authority or management responsibility where this occurs. Some in category D (nonmotorized recreationists) also suggested that using timber receipts for investment purposes would encourage overcutting. Private capital is definitely favored for developments such as ski areas. There was a good deal of agreement among respondent categories.

Policy Issue 10: Recreation Development on National Forest System Lands

Policy Question

What should Forest Service policies be on the use and development of National Forest System lands for recreation purposes?

Analysis

While most people favored continuation of present policy, other respondents wanted more developed recreation near urban areas (particularly on private lands). They would leave remaining areas for dispersed recreation with some restrictions on off-road vehicle use (preservationists with moderate support from individuals). Many in the preservation-oriented group pointed out that National Forests were needed for noncommodity uses, especially wilderness and dispersed opportunities; they wanted more trails and less intensive recreation.

Private recreation development on National Forest System lands was encouraged by some respondents in categories A, B, and J.

Policy Issue 11: Eastern National Forests

Policy Question

Do eastern National Forests pose special problems and unique opportunities? Should Forest Service management policies and programs be modified to permit more effective use and development of eastern National Forests?

Analysis

There is partial agreement among individuals, motorized and nonmotorized recreation groups, elected State officials, and State agencies that the purchase of land for eastern National Forests should be increased, that the management of these lands should be improved--primarily for nonmarket goods and services--and that research efforts should be implemented to support management programs.

Most commodity-service groups and Federal agencies also favored increased land purchases, if the land is managed for balanced multiresource outputs or for timber production. Some commodity-service groups opposed any purchase.

A number of respondents cautioned against increasing fuelwood availability from eastern National Forests because demand might surpass supply, leading to forest damage.

Policy Issue 12: Multiresource Planning and Management on Nonindustrial Private Forest and Range Lands

Policy Question

To what extent should Forest Service programs support multiresource planning on nonindustrial private Forest and range lands?

Analysis

Note: This issue deals only with nonindustrial private lands.

Individuals, commodity-service and nonmotorized recreation groups, State and local officials, and Federal agencies supported maintaining current Federal program levels. Within that framework, they urged increased State planning for both State and private lands, and increased educational efforts to inform private landowners of available assistance and management opportunities.

Motorized recreation groups and State and local agencies supported increased funding and multiagency efforts in planning and education.

Policy Issue 13: Forage for Domestic Livestock

Policy Question

What should be Forest Service objectives with respect to forage development for domestic livestock on National Forest System lands? What are appropriate guidelines for development of forage on NFS lands? What are cost-effective relationships among public and private expenditures to improve NFS range lands?

Analysis

All categories that responded agreed that improvement in range conditions are needed. However, there are differences in the supporting reasons.

Individuals, nonmotorized recreation groups, local elected officials, and State agencies supported range improvement as a way to enhance wildlife habitat. They recommended maintaining current levels of livestock grazing, or reducing grazing if necessary, to improve range-wildlife habitat conditions. Some respondents asked that public grazing fees be the same as fair market values charged for grazing on private lands.

Commodity-service and civic groups and Federal agencies in the Northeast and West supported expanding cost-effective range research and improvement programs to increase livestock grazing and maintain economic support for local communities.

Policy Issue 14: Minerals from National Forest System Lands

Policy Question

What actions should the Forest Service take to facilitate exploration, development, protection, and restoration (reclamation) of National Forest System lands for energy related and other important minerals?

Analysis

Widespread concern was expressed for the Nation's shrinking mineral base. All comments on this issue expressed some degree of support for energy and nonenergy mineral exploration and development while applying multiresource planning and environmental safeguards. They also noted inadequate mineral planning and consideration by the Forest Service. Emphasis was placed on mining law reform and revocation of inactive National Forests mining permits.

Groups commenting included individuals, commodity-service groups, motorized and nonmotorized recreation groups, elected local and State officials, and State agencies. Commodity-oriented individuals and groups favored faster mineral development than those that are preservation-oriented.

Policy Issue 15: Forestry Assistance for Non-Federal Public Lands

Policy Question

What is the need for Federal assistance to State and local governments in the development of public land potentials in the production of multi-resource goods and services and possible revenues? Should the Forest Service provide financial or technical and related assistance for forest management of non-Federal public forest lands?

Analysis

Note: This issue deals only with non-Federal public lands and does not apply to private lands.

In all categories, including State agencies, respondents were divided over whether or not there should be increased assistance to non-Federal public lands. Some favored technical assistance only, while others recommended technical and financial assistance. If there was a common theme among respondents, it was that any assistance provided be based on sound State plans.

SUMMARY OF RESPONSES THAT RAISED NEW POLICY ISSUES

Respondents suggested numerous topics for addition to the list of issues. Prominent among these were wildlife habitat needs and management; improvement of water quality (nationwide) and water production and allocation (West); wilderness (appropriate levels); and application of silvicultural systems. Concerns were also expressed over energy development on National Forests and

energy use implications of Forest Service programs, urban forestry in the East, and soils management. Further study of original source documents is needed to develop these topics into appropriate issue statements.

Supply-Demand Comments

A.--Respondents said projections of disposable income were too high; and inflation would reduce buying power. They also noted that the energy situation is critical, and received insufficient attention. Additionally, respondents said recreational demands will concentrate on those areas near urban population centers. However, wilderness demand and increased use of de facto wilderness was also expected.

Range supply and demand estimates were questioned by respondents. Generally, demand projections were thought to be too high. Respondents said water flow and quality received too little attention. Wildlife and fish assessments were commented on and frequently questioned by respondents. Some people suggested putting goals in species as well as acres of improved habitat. Other respondents recommended more emphasis on nongame nonconsumptive species.

B.--Commodity-service producers from nearly all Regions said more aggressive timber management is needed to meet demands. Alaskan comments asked what effect native timber harvests would have during this RPA period. Greater utilization of old-growth softwoods was urged. Respondents advised lessening harvest restrictions and called for better assessment of the NFS timber land use. Respondents said NFS potential was underestimated and S&PF was overestimated. Several national groups questioned the long-term equilibrium supply-demand model and real interest rates. They advised exploring other economic rationale for harvests.

Increased demands and costs for energy were cited as important considerations by business respondents. A need to meet increasing demands for developed recreation was noted, and respondents also said water for agriculture deserves higher priority.

C.--Motorized recreation user groups commented that motorized travel will continue to be a major use, possibly concentrated near cities. Recreation should accommodate increasing numbers of older people. Comments from the East questioned the nonmarket economic analysis while response from the Pacific Northwest noted there is no discussion of ORV use and added that the Forest Service is not contributing its fair share of recreational outputs.

D.--Preservation group respondents generally felt that much of the statistical information was faulty; respondents questioned basic assumptions of steady growth in population; people said the economy and resource demand may likely prove too high because of impacts from energy, scarcity, and inflation; respondents said the timber supply and demand is overestimated, as are other commodity estimates, and should not include export timber in supply estimates; others said that the timber projection seemed to assure the Forest Service's responsibility for keeping relatively constant timber prices. This could result in prices for National Forest timber at costs generally exceeding the value reflected by competition from the far West; and the Northeast respondents said that recreational demands were based on incomplete data, wilderness and other noncommodities were underestimated, and demand for designated wilderness would increase as the amount of "de facto" wilderness is reduced by conflicting

use. Californians went on to say that high rates on demand for red meat and timber products are encouraged through failure to recognize true costs of production in their prices; if this were done there would be a production shift from public to private lands. Some respondents said it may be more feasible to meet demands for red meat through more intensive pasture management rather than by increasing the amount of range land. Other comments were: wildlife habitat demand was not discussed; analysis of wildlife population data is needed for the South; mitigate environmental impacts by less logging and regulating dispersed recreation; old growth timber is irreplaceable in special cases; energy scarcity and inflation will shift demand toward self-propelled types of recreation. Mass transit system and use will impact on State and private lands.

E.--Civic group respondents felt the production of goods and services from timber, watershed, and range lands should be maximized. Others felt recreation projections will be affected, and need to be modified by energy crisis.

F.--Local elected officials from the Pacific Southwest Region said projections of demand for beef, wood, recreation, wilderness, and wildlife are too high. They also said historic trends in per capita income cannot be assumed to continue; the energy situation will limit recreation, wilderness and wildlife use while multiple unit housing and the use of nonwood materials will decrease demands for timber.

G.--State elected respondents in Hawaii felt the emphasis on reforestation should be on lands where forests have already been destroyed or on present marginal pasture and cropland.

Western respondents said the decreasing disposable income and the energy situation will increase conflicts and shift demands.

I.--Local agency respondents in California felt that more recreational facilities, accessible by other than foot, were needed for an aging population, while local respondents in the Northwest said that only unique areas should be recommended for wilderness.

Respondents also felt that Congress would need to provide a sound investment program for resource management to help meet the increasing demands for market and nonmarket outputs, that recreation, construction and energy demands will cause a substantial impact on renewable resources with a special need for intensive timber management, and that quality of life would be of greater importance in the future.

J.--State agencies in the East and Intermountain West commented that energy shortages will have uncertain effects on many supply-demand assessments. The Northern and Pacific Southwest comments noted that demands for market and nonmarket outputs are rapidly exceeding supplies. Habitat improvement was cited as an important need in the Northern and Intermountain Regions. State agency comments from the Rocky Mountain Region indicated that special programs and cost-sharing for nonindustrial private lands would be needed under all possible program directions to meet projected wood fiber demands. State agency comments from the Pacific Northwest said private lands are not a dependable source of timber, but the timber decline could be reversed by removing budget and harvest policy constraints.

Increased recreational demands were cited by the Northern Region State agencies with developed recreation needs especially noted in the Pacific Northwest. Pacific Southwest respondents said increased production emphasis would adversely affect other resources.

K.--Federal agencies in the Southwest and Northern Regions said water demands, particularly for agriculture and recreation, would increase and "irrigation value" should be increased. Comments from Federal agencies in the Rocky Mountain West indicated that mineral targets for Alternative Program Directions 1, 3, and 5 are correct if no more land is withdrawn from exploration. Comments from the South note that the assumptions do not consider possible major changes and so limit feasibility. Federal agency comments from the Pacific Northwest point out that salmon supplies are limited and advise that wilderness and nonwilderness ecosystem research needs should be determined.

Decision Criteria Comment

A.--Individuals said the decision criteria generally appear to be acceptable; however, more detailed descriptions were necessary. Energy, wilderness and local-regional needs often were said to need special attention. Consideration of land capability, cost-effective production and resource protection also were suggested as of major importance. Also, the sometimes unique capability of the Forest Service to provide market and nonmarket outputs should be considered in relation to private sector potential.

Respondents felt emphasis should not be placed on extremist or vocal minority views, but given to local opinion. Also, individual respondents in two Regions wanted the public to be aware which environmental impacts wouldn't be tolerated in selecting programs, and how public involvement would be analyzed. Nationally, respondents felt that the public should be regularly informed of resource management and actions on National Forest lands. Respondents suggested Federal and State involvement with private sector.

B.--Commodity interest respondents felt that national direction should allow for the allocation of land in a nonexclusive multiple-use manner to meet the needs and demands of the public for resource goods and services, community growth, jobs and nonmarket outputs on a cost-effective basis. Accelerated research could help to increase productivity of market and nonmarket outputs.

Additional comments were that environmental health and vitality of forest and range lands should rank high, and that national programs and assessments should clearly show the economic situation, budget priorities, regional realities and resource demands.

D.--Nonmotorized recreational user groups said that criteria should include conservation of energy and energy efficiency; a balance of market and nonmarket programs and public-private services; recognition of high costs of commodity production and opportunities to enhance nonmarket resource values.

Additionally, they suggested that more attention be given to changing public values to reduce rather than expand needs. They also said multiple use should be long range, not geared to short-term demand.

The recreation-preservation groups also called for consideration of the productive capability of forest lands, particularly when intensively managed; limitation of development of National Forests and Grasslands, except where cost-effective; and protection of high environmental quality. Additionally, they said that public input, especially from Federal, State, and local agencies is highly desirable. Also, they suggested that special attention be given to RARE II considerations. Some said the criteria are too ambiguous and that the real criteria are scarce or nonexistent. Respondents recommended producing intensively managed resources like timber, forage, minerals and developed recreation from prime lands that are already roaded, limiting the development of unroaded areas.

E.-- Civic group respondents emphasized investment and production to meet basic human needs while protecting national resource heritage. Respondents recommended a decreasing Federal role on non-Federal lands.

I.-- Local agencies suggested that social economic effects of the various alternatives on employment, income, and environmental quality should be considered as part of cost-benefit analysis. California felt that a national program direction must remain flexible so that emphasis can be placed on those resource elements requiring intensive management for achieving program goals, and that National Forests provide resources not readily available in the private sector.

J.-- State agencies should recognize differing State and regional resource goals, land capability limitations and be designed to reduce adverse impacts on resources. Additional suggestions were to apply standards consistently with recognition of ecological principles and recent legal positions, and to aggregate regional-State program direction into a national direction adjusted for national needs. Two agencies said that decision criteria should be specific and measurable.

Three eastern State agency officials questioned present net worth and benefit-cost analyses as a basis for decisionmaking. Rocky Mountain Region State agencies felt that benefit-costs should be evaluated for each APD as a whole, rather than on an element basis.

K.-- Some Federal agencies in the Pacific Southwest suggested that special emphasis be given to conservation practices to assure being able to meet national needs in perpetuity. One agency suggested that an interdisciplinary approach representing all resource interests be used in applying analysis of public comment to program development. Another said that funding for local roads should be investigated if demands on private forests are increased.

QUESTIONS AND ANSWERS ABOUT THE RPA PROCESS

The following questions and answers are a sample of the wide range of issues and concerns the public raised during preparation of the draft 1980 RPA Program and immediately after its release.

Q How would Assessment results change if basic assumptions are wrong? How would this affect the Program?

A Assessment findings and assumptions are basic information to be used in determination of the Program. Assumptions subsequently found to be in error could seriously impair the rationale used to arrive at the Program. In recognition of this RPA provides that the Program be updated every 5 years in order to reevaluate the situation and the need for changes or adjustments.

Q Will the Recommended Program be one of the draft Program Alternatives?

A Each of the Alternative Program Directions is achievable in the physical capability sense. They are not necessarily the best economic or social combinations of Forest Service programs and activities. They primarily serve to give perspective for determination of the Recommended Program. It is likely that the Recommended Program will be some modification or combination of one or more of the Alternatives.

Q How is the Assessment tied to the Program?

A The RPA Assessment establishes and describes the renewable resource situation including the basic assumptions, projections of supply and demand and opportunities to increase and extend the renewable resources of the nation's forest and rangelands. The Recommended Program will be the national planning response that decides how the demands will be met and which opportunities will be utilized.

Q Do each of the Alternatives eliminate all of the backlog of work to be done? If not, why not?

A The elimination of backlog is handled differently in each Alternative. Backlogs are programed activities needed to restore renewable resources to an environmentally sound operating basis providing that costs for treatment of backlog do not exceed the economic and environmental benefits to be secured from this treatment. The needed backlog treatment therefore varies by Alternative Program Directions which describe different Forest Service roles in providing renewable resource supplies.

Q Why wasn't a preferred Alternative identified in the review draft of the Program?

A In the draft, a selected Alternative was deliberately not chosen. Instead, the Alternatives covered a range from which the Recommended Program could be selected. The Department did not have a preferred Alternative and was interested in obtaining a complete range of opinion from the public as to what type of an Alternative the Secretary should recommend. Furthermore, any indication of a preference for a particular Alternative would orient the public comments to a critique of that Alternative, rather than a discussion of their preference for a Program. The National Environmental Policy Act requires that Alternatives be considered when making decisions which constitute a major Federal action. The five Alternatives respond to this legislative direction.

Q Were inflation, balance of payments, resource sufficiency, energy and import requirements considered when selecting Alternative mixes at the national and field levels?

A Inflation was not considered and all costs and receipts are constant 1978 dollars. Future use of the data in program funding will require updating pertinent data by use of an appropriate inflation factor. Balance of payments, resources sufficiency, energy and import requirements were considered early in the formulation of program Alternatives. They are a part of the Assessment projections of supply demand.

Q How have more efficient processing and harvesting, the use of residues for energy, and substitutes for solid wood products been incorporated into cut projections for the different Alternatives?

A Improved utilization of wood in the State and private sector has been estimated, and is displayed in the Projected National Outputs table for each Alternative in the 1980 Program document. Improved utilization on the National Forest System has been incorporated into the programmed sales estimates by time period in the same tables.

Q Were the five Alternatives in the draft Program realistic?

A In 1975, many reviewers commented that the range of Alternatives presented were too narrow and that a wider range should have been considered. Further, there was criticism that we did not have an Alternative that showed a decrease in Forest Service activities. These comments were considered when defining Alternatives for the 1980 program. Although the costs of Alternative 1 are high, it is still a feasible program. While Alternative 2 is a low program, it is still feasible. This broader range of Alternatives provides a view of the effects of substantial changes in the Forest Service Program. The Alternatives are realistic in that they provide a mix of resource outputs and that these output levels have been carefully developed to assure achievability and consistency between resources. Particularly in the short term, some of the Alternatives may be unacceptable to certain groups because of the sharp change

that would be required as compared with current activities. Selection of an Alternative where changes are substantial would probably have to be accompanied by a period of "phasing" into the new Program.

The Recommended Program will not necessarily be one of the draft Program Alternatives. Although each of the Alternative Program Directions are achievable in the physical capability sense, they are not necessarily the best economic or social combinations of Forest Service programs and activities. They primarily serve to give perspective for determination of the Recommended Program. It is likely that the Recommended Program will be some modification or combination of one or more of the Alternatives.

Q What is the average change from the 1975 RPA Program to the current RPA Program? What has caused this change?

A The total commercial forest land is now 83,470,000 acres compared to 90,838,000 in 1975, a reduction of 7,368,000 acres or about 8.1 percent. The breakdown by classification is in Tables B.9 and B.10.

Table B.8.--Total commercial forest land
by classification category

	Standard	Special (thousand acres)	Marginal	Unregulated	Total CFL	Other 1/	Total Net NFS
1975	57,652	8,103	20,524	4,559	90 838	91,926	182,764
1980	47,076	10,859	18,121	7,414	83,470	100,605	184,075
% Change	-18.3%	+34.0%	+11.7%	+62.6%	-8.1%	+9.4%	+0.7%

1/ Reserved, deferred, other forest, water, and nonforest land.

Abbreviations used: CFL = commercial forest land
NFS = National Forest System

These shifts have occurred primarily due to more intensive resource surveys, more emphasis placed on esthetics, wildlife, and wilderness; and recognition of lands not suitable for timber production.

Table B.9.--Total commercial forest land by classification category and region

Region	Standard	Special	Marg.	Unreg.	Total CFL	Other 1/	Total
<u>October 1975</u>							
thousand acres							
1	8 316	1,012	3,500	836	13,464	10,696	23,923
2	4,243	864	2,968	2,495	10,570	9,247	19,794
3	3,666	309	1,562	154	5,690	14,815	20,536
4	3,492	630	5,579	72	9,773	21,542	31,315
5	5,016	843	1,955	233	8,047	10,788	18,971
6	13,396	1,169	2,046	382	17,494	6,762	24,401
8	9,124	446	1,477	177	11,225	845	12,070
9	7,343	1,454	481	115	9,393	1,807	11,200
10	3,056	877	1,155	94	5,182	15,371	20,553
Total	57,652	8,103	20,524	4,559	90,838	91,873	182,764
<u>August 1979</u>							
thousand acres							
1	5,662	2,294	2,856	1,667	12,479	10,460	23,788
2	3,211	856	3,056	2,806	9,929	9,470	21,832
3	3,476	301	1,346	164	5,287	14,625	20,492
4	2,890	1,907	3,182	183	8,162	21,325	31,076
5	4,603	711	2,041	407	7,762	11,475	19,414
6	10,506	2,801	2 265	437	16,004	6,907	24,351
8	8,503	382	1,651	672	11,208	845	12,462
9	7,079	1,137	631	116	8,963	2,280	11,448
10	1,146	470	1,093	967	3,676	15,531	19,212
Total	47,076	10,859	18,121	7,414	83,470	92,918	184,075

1/ Reserved, deferred, other forest, water, and nonforest land.

Abbreviations used: CFL = commercial forest land
 Marg. = marginal
 Unreg. = unregulated

Q Why was the period for public comment only 70 days and why wasn't the period for public review of the draft document extended?

A Public involvement has been a part of the 1980 RPA process from as early as January 1977, when publications were made available to the public for review and comment about RPA procedures. The draft Report, Assessment, and Program documents were developed utilizing these comments. For this reason, we felt the comment period was adequate for people who have been keeping current, or who are continually involved with RPA, to review the documents and give in-depth comments. To further assist the public to understand and respond, briefing and informational meetings were held throughout the country. In addition to these sessions, local officials stated through press releases, The Federal Register, speeches, media coverage, and direct mail that they would "meet with interested groups, individuals, agencies, and officials to explain the draft documents and answer questions." The period between June 1979, when the comment period ended, and January 1980, is needed for the Forest Service and the Department to fully analyze and consider the policy issues and public comment in determining the Recommended Program. A longer public review period would have seriously compressed the time available to meet the schedule of transmitting the Assessment and Program to Congress.

Q How will the public comments be used?

A Comments provided by the Forest Service through the public involvement process will be systematically analyzed for content. The results will be summarized and used as information criteria in the determination process for the final Assessment and Recommended Program. The focus will be on issues, information improvement, and areas of inadequacy. Local-regional concerns in relation to national needs will be identified.

Q How were other Federal Agencies involved in RPA Planning?

A During the developmental phase of the draft 1980 RPA documents, a number of coordination meetings with other Federal agency personnel were held to review and comment on procedure as well as to identify the agencies' respective roles. Some Federal agencies designated individuals to work closely with the Forest Service. Several agencies such as BLM and SCS, have actually provided data which were used in the Assessment. Major long-range planning efforts of some agencies such as the Soil Conservation Service, as required by the Soil and Water Resources Conservations Act of 1977 (RCA), have involved intensive coordination.

Q Were RPA and RCA coordinated with regard to the State and private sector?

A Yes. The Forest Service and the Soil Conservation Service worked together at the national, regional, and State levels in an effort to assure that the data bases, assumptions, alternatives, and other features of the RPA documents are, to the degree practical, compatible with and not unnecessarily duplicative of the forthcoming RCA documents. This coordination was accomplished through interagency coordinating committees, sharing and review of resource data, and written instructions to agency field units.

Q How did State forestry agencies contribute to the RPA process?

A State forestry agencies supplied data for selected activities and outputs in fiscal years 1981 through 1985, and for the decade 1991-2000. Data for two program levels were reported for each year. The "current level" assumed that the dollar and manpower inputs would not change from those in Fiscal Year 1978, but the mix of activities and outputs could change. The "high level" assumed that dollar and manpower inputs would not be constrained so long as increases in the Federal share for cooperative forestry programs were at least matched by increases in the State share. S&PF Areas in the East and Regional Offices in the West worked with the State Foresters to develop Area and Regional S&PF data for each of the five Alternative Program Directions.

State participation was enhanced by use of an outline and format developed in the fall of 1977 by the National Association of State Foresters. The major parts of the outline are directly compatible with the requirements of RPA. The relationship between State forest resource planning and RPA is a complementary one. State forest resource plans provide important data for development of both the RPA Assessment and Program. State forest resource plans also provide an important link during the implementation of the RPA program as national goals and targets must be made meaningful at the State level.

Q What will be the effect on National Forest vegetation management now that 2,4,5-T and Silvex cannot be used?

A Effects have been studied on ponderosa pine and Douglas-fir types in California; four vegetative types in Oregon and Washington; loblolly pine, shortleaf pine and oak-hickory in the Southern Region; and conversion of jack pine, aspen and northern hardwoods to red pine in the Northeastern Region. On the National Forest System, growth of the types analyzed would decline 11 percent if 2,4,5-T were permanently banned and 32 percent if all herbicides were banned and silvicultural investment remained at present levels. Productivity could be maintained following the loss of 2,4,5-T if investments were increased 23 percent. When applied nationally, total roundwood supply from the National Forests could be maintained without 2,4,5-T for an added cost of about \$6.1 million per year. Without herbicides, \$48.1 million additional investment would be required.

Q How would the EPA suspension of the registration for 2,4,5-T and Silvex, if continued, affect implementation of the five RPA Alternatives on private forest lands?

A 2,4,5-T and other herbicides have been used for a variety of vegetative management purposes on private forest lands, particularly for site preparation prior to tree planting and for timber stand improvement. Both of these uses were approved for cost-sharing under the Forestry Incentives Program (FIP) prior to the EPA suspension. Impacts of the suspension would be greatest on private forest lands under Alternative 1 and 4, moderate under Alternatives 3 and 5, and least under Alternative 2. If the suspension continues or if the registration of 2,4,5-T and Silvex is cancelled, alternative methods of vegetative management (i.e., prescribed fire, mechanical treatment, or other chemicals) could be used. However, these methods would be more costly and generally less effective. Thus, the acreages of reforestation and timber stand improvement on private forest lands projected under the five Alternatives will be re-evaluated if it becomes clear that a long term suspension or cancellation of 2,4,5-T is likely.

Q Trend of range conditions is not discussed. Are the Nation's ranges improving?

A Although trend information based upon uniform standards and criteria are not available for all ownerships on all rangelands, we believe the overall trend is upwards. This belief is based upon the informed opinion of personnel in the Forest Service, Bureau of Land Management, Soil Conservation Service, and range educators in several western universities.

Q Why is there no breakdown of rangeland condition by ownership?

A Distribution of rangeland condition is not presented because the different methods and systems used by the various agencies to evaluate condition do not permit reliable comparisons.

Q Can all grazing needs be met by the private sector without use of public lands?

A Yes. The private sector could meet all grazing needs by increasing production on both privately owned pasture and range. The total cost to the Nation would be higher economically and socially because it would result in inefficient use of the Nation's range resources. Major adjustments in the livestock industry would shift to other areas of the country where private sector grazing capacity is available. Closing of grazing on the public lands would force some private ranch operations in the West to discontinue or be reduced since there is a strong dependency relationship to the public lands. Due to relocation of ranching operations, there would be substantive economic and social impacts on some 25,000 permittee families who presently use public lands throughout the United States for complementary grazing operations.

Q Will the final Program contain wildlife population targets?

A Because of our constrained data base, the animal population targets referred to will be expressed as a percentage deviation from our existing program. The percentage figures, of course, vary depending on the RPA Program selected.

The habitat management standards proposed will be considered during the land management planning process. This should provide the information to make these targets realistic for the 1985 program.

Q It would appear that the RPA Program process is designed to produce a balanced program among the various resources of the National Forests. What happens when Congress upsets this balance through appropriation and what is needed to ensure that this does not happen?

A It is the prerogative of Congress, in approving funds, to deviate from the RPA Program submitted by the Administration. It would probably require an amendment to the Renewable Resources Planning Act to prevent this from happening, which is unlikely.

Q Is assistance to States for urban forestry included in the RPA Alternatives, even though it is not included in the President's 1980 budget?

A Alternative 2 has been adjusted to delete programs for which the President has proposed no Federal funding in 1980. Assistance to States for urban forestry and for rural fire protection and control are among the cooperative programs proposed for elimination. All existing cooperative forestry assistance programs are projected at current or accelerated levels in the other four Alternatives.

Q Is the National Program for Research related to RPA?

A The U.S. Department of Agriculture, in cooperation with the National Association of State Universities and Land Grant Colleges, has developed a National Program of Research for forests and associated range lands. It strengthens the research contribution to the 1980 RPA Recommended Program, enhances Federal and State and Research planning cooperation, and ensures the involvement of consumer and user groups in research planning.

Q Why are you concerned with mineral activities on National Forest System lands when the planning acts deal only with renewable resources?

A Planning responsibilities for renewable resource values cannot be accomplished without consideration of the nonrenewable resource values that are found on and under the Nation's forest and range lands. Through recognition of these values, better integrated and more realistic long-range planning can be achieved. Forest Service policies and activities, particularly on National Forest System land can directly affect how mineral activities will be conducted.

Q What Congressional action is required on the final RPA documents?

A The President transmits to Congress the Assessment, the updated Program, and a detailed Statement of Policy, intended to be used in framing budget requests by the Administration on the date Congress first convenes following each updating of the Assessment and the Program. Either House has ninety days for review and in the event that they disagree, adopt a resolution to disapprove, revise, or modify the Statement of Policy. The President should, subject to other actions of the Congress, carry out programs in accord with the Statement of Policy.

Q How is RPA and land management planning related?

A Land and resource planning addresses strategic long-range priorities and questions for the National Forest System on local and regional levels under the overall framework of planning and direction defined through the RPA process. Regional planning as related to RPA, includes compilations of the Assessment information by Regions; disaggregations of RPA Program Targets to the National Forests; coordination with State and other agencies in meeting RPA requirements; and interregional comparisons of management outputs. The relationship between the RPA Recommended Program, land management planning, and the annual program-budget process is now guided by the requirements of Section 6 of the National Forest Management Act (NFMA) of 1976. These requirements provide that regulations be developed that detail and refine a system for coordinated planning related to the Forest Service that has evolved through the years. Allocation of targets will be based on the resource capability of each administrative unit to contribute to national demands, with consideration of relative efficiency of production.

Q Alternative 2 shows major reductions in recreation use. Do you really believe the public is going to stop visiting the National Forest? Do you plan to lock the people out under this Alternative?

A We do not anticipate any wholesale closures of National Forest lands under Alternative 2. However, only those facilities absolutely necessary to provide for resource protection and health and safety would be provided. This means the public would not be provided any convenience facilities and this would tend to significantly reduce the use. Many campgrounds, for example, would be closed.

Q Some resource questions appear to be omitted from the issues. For instance, why is there no issue in the draft 1980 Program related to wildlife?

A Although the 15 selected issues as written do not contain the word "wildlife," it is implicit in several. For instance, treatment of the pesticide issue can not be complete without a thorough evaluation of effects on wildlife. Wildlife is also an important consideration in the issues involving herbicides, consumer payments for nonmarket goods and services, eastern National Forests, and multiresources planning and management on nonindustrial private forest and range lands. We would also expect wildlife considerations to surface in some of the other issues as they are further developed for resolution.

Other questions are implicitly included in the same manner, and will be addressed in the resolution of several of the issues also.

Q How will policy issues be used in determining the Recommended Program?

A Issues will play a major role in determining the 1980 RPA Recommended Program. Each issue area is presented as posing policy choices and actions the Forest Service might consider. No preferences are indicated, nor are Executive or Congressional policy constraints indicated except where they may limit implementation of any specified course of action. The final Recommended Program will be responsive to such policy constraints and guidelines, and will consider public comments and suggestions resulting from the draft RPA documents. It is highly possible that public and other agency review of these documents will identify additional issues and options which should be addressed.

Q How were policy issues determined?

A The development of a recommended Forest Service program requires decisions on a number of policy issues concerning the management and use of the Nation's forest and range lands. Many potential policy issues were identified as the Assessment and Program were developed. The following criteria were used in identifying those issues that will have significant impacts on the determination of a recommended Forest Service program:

- 1) Significant public concern or other public agency concerns;
- 2) Readiness for agency and Department decision or recommendation;
- 3) Ability to resolve it within the Forest Service and the U.S.;
- 4) Significance of impact on the overall alternative programs;
- 5) Availability of current and indepth study background for reference.

Fifteen issues have been identified. These issues and the options for resolving them are described in the Report, and in the technical document, "Alternative Program Directions 1981-2030."

Q How will new program initiatives or changes in Departmental policy or direction be incorporated into the Program once a long-term Alternative is selected?

A The RPA Program is updated every 5 years. Policy changes as a result of new information and changing national priorities will, however, continue between RPA Program updates in the same manner as they always have. The updated RPA Program will evaluate the changes in light of the Nation's total renewable resource needs and will make the appropriate adjustments.

Q Is there a potential for overlap and public confusion between NFMA rule revision and RPA update?

A A potential for confusion always exists, but we believe that the links between the RPA Assessment and Program activity (the national planning level) and regional and forest planning (including public involvement) which are provided for in 36 CFR 219.4 and 219.5 minimize the risk for confusion. Also, review of the regulations for possible revisions may be completed sooner than 1985. Consequently, the rules could be revised in advance of the RPA update. We prefer the flexibility given in Section 219.15 to revise the rules anytime between their effective date and 6 years hence (1985), with subsequent reviews at 5-year intervals.

Concern that the RPA Program Alternatives make no provision for wilderness reviews made during the second round of NFMA Plans can be further addressed by RPA. The Program's "out year" figure of 136,000 additional acres is just an estimate. The Program document could specify this and suggest that a more exact figure must await the completion of second generation land management plans as per 36 CFR 211.12(e). There is no rational way at this time to portray or explain how the NFS will be affected past 1985 by the potential for wilderness detected through planning accomplished in the out years.

Q Do each of the reforestation alternatives provide for reforesting the acreage deforested as well as reducing the reforestation backlog?

A Only Alternative 1 meets the intent of the National Forest Management Act of reforesting an acreage equal to the acreage cutover or otherwise deforested each year, plus a portion of the backlog to eliminate the backlog by 1985.

About 400,000 acres would have to be reforested each year to keep up with the rate of areas deforested and about 160,000 additional acres would have to be reforested during FY 81-85 to eliminate the backlog by 1985.

Q Why wasn't an alternative developed that included a goal to "achieve efficient levels of timber productivity that will (1) minimize real consumer cost impacts through an adequate domestic supply and (2) build the potential for international net supply of wood products"?

A It was decided early in the 1980 RPA process that development of alternatives be done comprehensively with full consideration of multiple resource interactions. This was done to assure that all alternatives would be realistic and physically achievable in combination with other resource outputs. The development of an Alternative that would focus primarily on timber production potential is assumed to be an infeasible direction.

It undoubtedly will be suggested that the advantage gained by developing such a primary function alternative would be for use in evaluating discretionary trade-off costs which may constrain potential harvest levels and management practices in order to satisfy other resource output objectives. Potential yield, however, is identified by the Assessment and appropriately determines the realistic upper resource supply limits that will be used in determining trade-offs relative to the Recommended Program. This is a principle of the Assessment's linkage to the Program.

Q What are the differences in the National Forest System volume of timber offered for sale between each Alternative and the Recommended Program transmitted to Congress in March 1976?

A

Table B.10.--Timber volume offered for sale

		<u>1980</u>	<u>1981</u>	<u>1982- 1985</u>	<u>1981- 1990</u>	<u>1986- 1990</u>	<u>1991- 2000</u>	<u>2001- 2010</u>	<u>2011- 2020</u>
		(billion board feet)							
1975 Recomm. Program Range	High	14.6			16.2		17.9	19.3	20.2
	Low	13.4			14.6		15.5	16.1	16.6
Draft 1980 Program Alternatives									
1			12.5	12.7		13.6	14.6	15.9	17.4
2			10.5	9.7		9.7	9.4	9.2	8.6
3			12.2	12.1		12.9	13.6	14.8	15.5
4			11.5	10.7		9.7	9.6	9.3	8.9
5			11.5	11.5		12.3	12.6	12.7	13.0

Q What timber harvest scheduling policy was assumed for each Alternative, or was a policy other than nondeclining flow used in any Alternative; if so, which one?

A Nondeclining flow was used as the basic timber harvest scheduling policy for all Alternatives. Section 13(a) of the amended Resources Planning Act provides for departing from this basic policy to meet overall multiple-use objectives. Regulations implementing this provision are expected later this spring.

Q Why is the maximum National Forest System timber sale projection for future years less in the 1980 RPA than in 1975 RPA?

A The draft 1980 RPA alternatives do not project as high a level of timber sales from the National Forest System as the 1975 Recommended Program for several reasons. The greatest effects have come from the constraints on harvest necessary to give adequate consideration to competing uses of the land. For example, RARE II wilderness recommendations plus a portion of the "further study" lands will reduce the commercial forest land base considerably below the level envisioned by the 1975 Recommended Program.

Q Why do all Program Alternatives show a continuation of net imports of wood products?

A The Alternative Program Directions address the projected supply-demand situation, environmental concerns, and national policies. All Alternatives were designed to realistically respond to these objectives.

The supply-demand situation for wood products must be viewed in a total worldwide context. Since domestic markets generally offer the greatest net returns, the United States would not become a net exporter of wood products until domestic supplies force prices below foreign price levels.

Q Are departures from even-flow a part of the Alternative Program Directions?

A No. The APD output targets are all achievable without departures. However, part of the increased harvest called for in some of the Alternatives could be obtained through departures if this is shown to be feasible through the land management planning process.

Q Will the recommended Forest Service Program be constrained by budget limitations?

A The Forest Service developed the five alternative program levels in the draft document in response to needs expressed in the Assessment. The five levels differed according to varying emphasis on market and nonmarket commodities.

The Act requires that anticipated costs be directly compared to total related benefits and returns to the Federal Government, a discussion of priorities for accomplishment of opportunities and that the President transmit the Assessment and the Program--"together with a detailed Statement of Policy intended to be used in framing budget requests by that Administration"--. This language directs the Forest Service to develop realistic recommended programs whose costs and benefits can be compared to other national priorities.

The final Recommended Program will respond to the Assessment; economic, physical-biological, and social criteria; public comments on the draft documents; and national policy direction.

National policy includes control of inflation, and the final program will be developed with this in mind.

The final program will also consider efficiency in expenditures. For example, a sharp rise in program level in a single year may be inappropriate, because the Agency may not be able to efficiently handle the increase. A more logical approach might be to phase into a higher program over a period of several years.

Q How does the RPA effort relate to the President's budget process?

A The Recommended Program provides directions for the Forest Service annual program budget process, subject to the President's Statement of Policy for implementation. The program defines the long-range mission, describes national goals, and displays the national targets that provide the base for the annual program-budget process. Alternative budget level proposals are developed and evaluated against the recommended program, and final budget differences are resolved or explained.

Q Why weren't budget limits used to guide selection of Alternative Program Directions?

A In the final phase of the decision process, budget levels will be considered in selecting the recommended program. We felt it was important to first develop the program in response to our economic, social, and physical-biological criteria; the Assessment; and the public comments.

Using this procedure assures that attention to all resources based on economic, environmental, and social criteria will be balanced in the final program because this balance is determined before budget limitations are imposed. This retains the feature of the RPA program as a true guide to Forest Service planning, with appropriate consideration given to the merits of all resource values. Budget constraints would result in a more extended period of resource investments than would otherwise be the case.

Q In what way are RARE II and RPA goals interrelated?

A RARE II is an integral part of both the RPA process and the land management planning processes and, as such, is fully consistent with the 1974 Resources Planning Act and the 1976 National Forest Management Act. The 1975 RPA Recommended Program is the basis for current Forest Service national directions and will continue to be until the Administration and Congress concur on the 1980 RPA Program Direction, now in preparation. The 1980 process is incorporating the data and analysis information developed by the RARE II process. The RARE II wilderness recommendations will be used as criteria in determining an updated 1980 RPA Recommended Program. The process to develop the 1980 RPA draft ran concurrently with the RARE II process, but the RARE II proposed action was unknown at the time the RPA draft Alternative Program Directions were prepared.

Q Quantitatively, what is the relationship of RARE II to the 1975 RPA Program and the 1980 RPA proposed program?

A The 1975 RPA Program recommended 25-30 million acres of wilderness. Today, there are 15.3 million acres of National Forest wilderness. Another 3.4 million acres from Primitive Area reviews have been recommended to Congress for wilderness. RARE II recommendations for wilderness total 15.1 million acres. Additional recommendations could come from the 10.8 million acres recommended for further planning. The above recommendations are projected in the proposed 1980 RPA Program.

Q How were the population projections derived?

A The population projections were prepared by the U.S. Department of Commerce, Bureau of the Census. Although reasonable and informed people can argue that they are too high because of the assumption on fertility rates, or too low because of illegal immigration and population undercounting, the Census projections are generally accepted as reasonable.

Q How were the projections of economic activity and income derived?

A The projections of economic activity and income, which are being used in preparing the final report that will be submitted to Congress, have been revised and in the decades beyond 2000 are substantially below those used in the review draft. These projections have been prepared by the U.S. Department of Commerce, Bureau of Economic Analysis.

Q Were energy shortages considered? It appears that the prospective energy situation had not been adequately taken into account in the Assessment.

A This may well be true since the prospective long-range energy situation is not well defined. In general, allowances were made for higher energy costs in preparing and revising the parts of the Assessment where such costs are likely to have significant impacts--for example, the demands for range grazing, some outdoor recreation activities and timber products.

Q In view of the energy situation, the projected demand for fuelwood seems too low.

A This may be correct, but on the basis of the available information there did not seem to be any basis for changing the projected demands shown in the review draft. A special study is underway to develop better methodology for projecting fuelwood demands.

APPENDIX C

ECONOMIC ANALYSES

This section describes the economic analyses used to develop the 1980 Recommended Program. As a part of that process, present net worth values were developed for the resource elements of the Program. These values, together with measures of physical-biological and social effects, facilitated the evaluation and comparison of Alternatives to determine the Program.

Present Net Worth Calculations

Present net worth is the dollar difference between estimates of all benefits and all costs for a program distributed over time and discounted back to the present. Derivation of present net worth involves the estimation of costs, output volumes, and values for the outputs that are expected to occur in the future. However, costs or benefits that occur in different time periods cannot be considered to be of constant value. Discounting is the mathematical process of reducing costs or benefits that occur in the future to a common point in time so that they can be added and compared.

Discounting

Discounting recognizes the time value of money. Benefits that occur in the future are worth less today because of the opportunity to invest money to earn interest. For example, a benefit of \$100 that occurs 1 year from now is not quite worth \$100 today, because an individual would have had only to deposit \$95.23 in a 5-percent savings account to have \$100 a year from now. Therefore, the present value is viewed as only \$95.23 instead of \$100. In investment analyses, the interest concept is broadened to reflect the "opportunity costs of capital."

The determination of the discount rate is theoretically and empirically complex. There is no consensus among economists on what rate should be used for evaluating long-term investments. To provide consistency, the Office of Management and Budget has since 1969 required a discount rate above inflation of 10 percent or $7 \frac{1}{8}$ ^{1/} for water related projects for evaluating all Federal programs. However, the conceptual basis for this rate and its relevance to current economic conditions has been recently reviewed. Statistical evidence and analysis showed that in constant dollars a rate of 4 percent might represent the opportunity cost of capital in our society. ^{2/} For RPA Program

^{1/} This rate, adjusted annually, is based on average yield of long-term government bonds.

^{2/} U.S. Department of Agriculture, Forest Service. Discount rates to be used by the Forest Service for long-term investments. June 1979, 11 p.

evaluation purposes, discount rates of 4 percent, 7 1/8 percent and 10 percent were used with 7 1/8 being used for presentation purposes.

Costs

Unit costs for the elements of the RPA Program were developed by Forest Service regional field units to reflect local production characteristics. Cost estimates developed by the field units were also reviewed by the Washington Office to ensure consistency among Regions and to check for proper relationships among alternatives.

Two types of costs were recognized in the development process:

1. Operation and maintenance.
2. New investments.

These were then grouped and related to the resource elements.

In developing the total and average cost estimates, the Washington Office and field units used the following set of principles:

1. A unit cost-total cost function for each Program element and Alternative was developed covering the full range of outputs. These cost estimates were the supply functions reasonably expected from meeting the minimum acceptable standards for environmental and multiple-use constraints.
2. Cost functions were held fairly stable for the same output if technology or resource conditions were not changing rapidly. However, the basic theory of cost with constant technology (or no major change) calls for rising unit costs as output increases if production conditions become more difficult.
3. Wherever a Program Alternative required additional inputs without a significant change in quantity outputs, the reason for the added input was to be explained explicitly.

To evaluate individual resource elements in terms of their contribution to present net worth, support element costs were related to the resource elements. 3/ The following criteria were used:

1. Support costs that were used to produce a resource output were allocated directly to the appropriate resource element.
2. The remaining costs or those that could not be assigned to one output were distributed based on the net benefits in the resource elements.

3/ For further details see U.S.D.A. Forest Service. 1979. Summary of the process used to distribute support element costs to the resource elements, October 19, 1979, 52 p.

Values

To achieve consistent valuation of the various goods and services, benefit values for all resources were conceptually based on estimated market values. Market outputs were valued in terms of what people are willing to pay as evidenced by market transactions using constant dollars. Nonmarket outputs were valued in terms of what people might reasonably be willing to pay rather than go without the goods and services. Because of the nonmarket nature of the consumption of dispersed recreation, wilderness, water, and wildlife outputs, value estimates for these products were based on residual values, use behavior, or surveys of users.

Table C.1 summarizes the output values developed for seven resource elements by Forest Service Region. No benefits are shown for support elements because these elements represent costs necessary to achieve the resource element outputs. In addition, all values are adjusted to a common date of January 1978.

Timber Values

The 1978 timber values are weighted averages of Forest Service timber sale data for fiscal years 1974 to 1978. Prices were derived from quarterly Forest Service cut-and-sold reports. Sawtimber prices were adjusted to include purchaser credits for road-building costs. Values for hardwood roundwood and softwood roundwood are averages for all sales other than sawtimber. 4/

Average prices over a time period were used rather than prices for a single year because of the wide fluctuations in timber prices. A 5-year period was chosen as the approximate cycle in stumpage prices. To compute the final value for each product category, the average price for each year from 1974 to 1977 was inflated by 6.6 percent annually to convert to 1978 dollars and was weighted by the annual volume sold.

To develop estimates of future values of timber, the Timber Assessment Market Model (TAMM) was used (Adams and Haynes, 1979). TAMM is a spatial market model developed to project long-range trends in price, consumption, and production of timber. The model includes nine supply regions and six demand regions. Model parameters (such as demand and supply elasticities) were estimated from historical data from the period 1950-1976, making projections consistent with past market behavior. Because real prices are used, projected price changes are in addition to general inflationary increases.

Product demand and supply equations were developed for lumber and plywood in each demand and supply region. Transportation costs were explicitly considered. Estimates of pulpwood, miscellaneous products, lumber and plywood trade, and fuelwood production in each supply region were derived from exogenous projections of consumption. Stumpage supply consists of public harvests set by the program alternatives and by private supply that is responsive to

4/ Roundwood products were converted to cubic feet using assumptions of two cords/thousand board feet and cubic feet/cord ratios from U.S. Forest Service Resources Report 14 (1958).

Table C.1. (cont)--Dollar values of benefits for 1980 Programs, by Resource Element and Region

Element and output description	Unit of measure	Average regional value in dollars per unit									
		1	2	3	4	5	6	8	9	10	
<u>Wilderness</u>											
Wilderness use	RVD	8.00	8.00	8.00	8.00	10.00	8.00	12.00	12.00	8.00	
<u>Wildlife and Fish</u>											
Big game use	RVD	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	10.50	
Non-game use	RVD	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	
Inland sport fish use	RVD	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	
Sport fish anadromous	RVD	19.50	-	-	19.50	19.50	19.50	-	19.50	19.50	
Commer. anadromous fish	LBS	1.61	-	-	1.61	1.57	1.61	-	0.62	0.62	
Waterfowl use	RVD	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	
<u>Range</u>											
Grazing use (livestock)	AUM	5.57	5.88	5.51	4.96	6.00	5.90	3.76	4.41	3.00	

Abbreviations used:

AF--acre feet	RVD--recreation visitor day
AUM--animal unit month	RW--roundwood
BBTU--billion British thermal units	ST--sawt imber
HW--hardwood	SW--softwood
LBS--pounds	

both stumpage price and inventory volumes. In each year of the simulation, the supply and demand relationships interact to determine market clearing prices and volumes consumed and produced.

To convert the projected TAMM prices to relevant indices, nine TAMM supply regions were aggregated into five NFS regions using 1978 NFS harvest volume. Indices for NFS Region 6 (Pacific Northwest) are comprised of 67 percent western-Pacific Northwest supply region and 33 percent eastern-Pacific Northwest supply region. Indices for NFS Region 8 (South) are comprised of 73 percent South Central supply region and 27 percent Southeastern supply region. Finally, indices for NFS Region 9 (North) are comprised of 68 percent North Central Supply region and 32 percent Northeast supply region.

The results of simulating the RPA Alternatives using TAMM indicate that the real value of softwood stumpage will increase throughout the planning period, 1978-2030 (Table C.2). Hardwood prices are expected to remain constant in real terms through 2030.

Range Values

Unlike timber, market values for grazing products from Federal lands are not readily available. Except for competitive bids on some Department of Defense lands, Federal grazing is not exchanged in a free market. Market prices for rental of private pasture and range are not well documented. Also, private pasture and range are rented under circumstances not comparable to the public range; for example, the service provided by the lessor, in addition to forage, may be quite different from the service provided by Government.

Consequently, a proxy measurement of market value was necessary to evaluate the RPA range outputs. The method adopted is based on the price of hay (Henderson, 1965). The price of hay reflects the availability of pasture and other substitutes on the forage supply side, and cattle prices and other factors on the demand side. The value of hay is reduced by a factor which reflects the quality of the grazing relative to hay and the difference in harvesting costs. The resultant value is the gross value of the grazing when the lessor provides all of the improvements and improvement maintenance.

The advantages of the hay price grazing value method are:

1. It is simple to calculate.
2. The market for hay is well established throughout the United States.
3. Hay prices are available for each State from the Economic, Statistics, and Cooperative Service (ESCS). Normalized hay prices are also calculated by State each year for use by the Water Resources Council. Thus, a consistent normalized set of data is available from which to calculate economic value of public range.

Table C.2.--Projected indices of softwood stumpage values for selected years, by NFS Region and RPA Alternative

(1978 = 100)

Region and year	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5
R-1 through R-4 (Rocky Mountain)					
1985	127	130	129	130	127
1995	164	177	168	181	171
2005	202	232	210	253	223
2015	259	317	271	361	289
2025	322	422	336	479	360
R-5 (Pacific Southwest)					
1985	131	135	130	132	129
1995	172	195	176	188	180
2005	197	244	205	230	214
2015	234	303	247	285	265
2025	279	373	291	353	219
R-6 (Pacific Northwest)					
1985	136	140	139	139	137
1995	160	178	162	177	164
2005	182	205	186	210	193
2015	224	269	231	272	241
2025	276	342	277	336	293
R-8 (South)					
1985	129	132	129	132	130
1995	164	172	166	212	167
2005	206	221	208	227	213
2015	250	280	256	294	266
2025	287	354	310	376	326
R-9 (North)					
1985	109	112	111	112	110
1995	127	138	130	138	135
2005	149	166	150	165	161
2015	178	198	178	197	188
2025	209	231	208	229	217

4. The method provides consistent results.

Formula: $\text{Wt.} \times \text{Hay Price} \times \text{Factor} = \text{Rate}$

Wt. = Average animal weight

Hay Price = Average price per ton of hay

Factor = Quality factor of pasture

Lush, green, high protein pasture.....	0.22
Excellent tall grass pasture.....	0.20
Fair to good native pasture, predominantly shortgrass.....	0.15
Poor short grasses or considerable weed growth....	0.12

Rate = Total value of grazing per animal per month

In order to use the above formula, it was assumed that the average animal weighed 1,000 pounds. Also, the hay price used is the normalized price of hay for 1978 by State developed for use by the Water Resources Council. This price is the best estimate of real hay value in each State and does not reflect short-term deviations in hay prices.

The pasture quality factor of 0.12 was used as being most representative of range on National Forests and on several National Grasslands; however, on National Grasslands in Regions 1 and 2, a quality factor of 0.15 was used. Also, \$1.74 was subtracted from the value derived by the formula to account for the services provided by the private sector.

The values used for RPA evaluation differ from the fees that will be charged on NFS lands. Users of Federal grazing lands have historically been charged a grazing fee which originally reflected administration costs. The value of grazing to the user that was not reflected in this cost became attached to the grazing permit itself. Attempts have been made over the past 20 years to increase the fee so that it represents the value of the range forage used, but these attempts have only been partially successful. The formula specified by Public Law 95-514 yields a base fee of about \$2.40 per AUM. This fee value was not used because it was felt that it would significantly undervalue the range resource.

To develop estimates of future values for range, the results of National-Interregional Agricultural Projections (NIRAP) System developed by the Economics, Statistics, and Cooperatives Service of the U.S. Department of Agriculture were used (Quance, et al.). This system is a simulation of the food and agricultural production system. By comparative analysis of alternative assumptions, possible paths for agriculture production are identified.

The NIRAP System was used to project grazing demand by regions. This involved disaggregating demand for each feed by each livestock class from the total feed demand. This provided the capability to project national-level feed/livestock estimates under alternative assumptions since the model could project feed demand for the various livestock classes in addition to livestock projections. The demand and supply relationships determine the market clearing prices. Based on the results of this system, real values of grazed roughage were projected to rise about 18 percent between 1978 and 2025 (Table C.3).

Table C.3.--Projected rise in real values of grazed roughage, 1978-2025

(1978 = 100)

<u>1985</u>	<u>1995</u>	<u>2005</u>	<u>2015</u>	<u>2025</u>
104	109	114	116	118

Mineral Values

To evaluate the mineral resources, mineral outputs were put into three categories:

1. Common varieties--all common mineral materials sold on a price per unit basis used for construction, road surfacing, fill, etc. Examples are sand, gravel, crushed stone, dimension stone, and rip-rap. Outputs were measured in short tons (2,000 lbs.).

2. Energy minerals--all minerals (resources) which are used for energy production. Included are leasable minerals/resources such as coal, petroleum, natural gas, geothermal resources, and locatable radioactive minerals (uranium and thorium). The unit of measurement is Billion British Thermal Unit and is derived from intermediate units of measure such as barrels of petroleum, thousand cubic feet of gas, and short tons of coal.

3. Other leasable minerals--leasable, nonenergy minerals for which rentals and/or royalties are paid to the United States through either the Forest Service or Department of Interior. Examples are phosphate rock, sodium, potassium, and acquired mineral estates. The unit of measurement is short ton. ^{5/}

Most of the above mineral commodities are traded in the open market, and price data are available from numerous statistical reporting services both in and out of government. However, most prices reported are for the point of first sale or shipment (e.g., oil and gas at the wellhead, coal at the tipple) after some production costs have been incurred. The point of measurement relevant for RPA evaluation purposes is the "in-place" value of the mineral deposit before extraction. This is analogous to the stumpage value for timber. Therefore, in order to measure the in-place values of mineral resources, the average price in 1978 for each commodity was multiplied by the percentage royalty for that commodity. This was further adjusted to reflect the NFS share of the total U.S. mineral disposal program workload on NFS lands to obtain the estimated in-place Forest Service program values for each commodity.

^{5/} A value for locatable materials other than uranium and thorium was not determined because of the lack of resource data. Yet, there are numerous locatable deposits on NFS land producing substantial outputs (e.g., vermiculite, talc, and antimony) and many others from which future outputs are assured. It is recognized that future RPA efforts will have to deal with the valuation of locatable minerals because of the anticipated workload involved in NFS administration of the mining laws and surface use regulations.

This calculation can be represented by the following formula:

$$\text{Program value for commodity Q} = (\text{Market price of commodity Q}) \times (\text{royalty rate for commodity Q}) \times (\text{NFS share of workload for commodity Q})$$

Tables C.4 and C.5 show NFS Program values and the data used to derive these values. Prices were obtained from Department of Energy (DOE) and Bureau of Mines sources including the Monthly Energy Review and the annual Mineral Commodities Summaries. The royalty data were derived from discussions with specialists in the Geological Survey and Bureau of Mines. Royalty rates used do not reflect other cash payments into the U.S. Treasury in the form of fees for exploration and mining permits, cash bonuses associated with competitive leases, or yearly rentals for lease areas. In some instances, minimum royalty rates are set by law.

Values derived in Tables C.4 and C.5 were used to generate values for the output classifications for each NFS Region. The values were determined by taking a weighted average of the NFS Program values for the commodities in each category. These weights are shown in Tables C.6 and C.7.

Future values for energy resources were derived from conditional forecasts of the energy situation prepared by the Department of Energy in its Annual Report to Congress (DOE, 1977). The following compound annual rates of growth for energy commodity prices are based on DOE Series C forecast (Table C.8):

Table C.4.--Estimated program unit values for energy minerals on
NFS lands, 1978

Commodity	\$/Unit	Price in terms of BTU's (\$/BBTU)	Royalty rate	In-place value (\$/BBTU)	NFS share of total workload	NFS program value (\$/BBTU)
Oil	\$13.95/barrel	2,491	0.125	311	0.8	248.0
Gas	1.70/MMCF	1,700	0.125	213	0.8	170.0
Coal	21.00/STON	875	0.125	109	0.8	87.0
Geothermal	5,538/MW	291	0.10	10.7	0.8	8.6
Uranium	43.00/lb	154	0.05	7.7	0.9	6.9

Abbreviations used:

BBTU = billion British thermal units
MMCF = million cubic feet
MW = megawatts
STON = short ton (2,000 lb)
lb = pound

Table C.5.--Estimated program unit values for other leasable and common variety minerals on NFS lands, 1978

Commodity	\$/Unit	\$ per STON	Royalty rate	In-place value (\$/STON)	NFS share	NFS program value (\$/STON)
Phosphate Region 4	8.00/STON	8.00	0.05	0.40	0.8	0.32
Other regions	17.60/MTON	15.97	0.125	1.96	0.8	1.60
Barite	20.60/STON	20.60	0.05	1.30	1.0	1.03
Lead	0.34/lb	680.00	0.05	34.00	1.0	34.0
Zinc	0.31/lb	620.00	0.05	31.00	1.0	31.0
Copper	0.66/lb	1,320.00	0.05	66.00	1.0	66.0

Abbreviations used:

STON = short ton (2,000 lb)

MTON = metric ton (1,000 kilograms, 2,205 lbs)

lb = pounds

Table C.6.--Energy minerals commodity shares of total output by NFS

Region	Oil	Gas	Coal	Geothermal	Uranium
	(Percent)				
1	90	9	-	1	-
2	20	4	25	1	50
3	1	0	-	1	98
4	7	3	75	1	14
5	79	20	-	1	-
6	-	-	-	100	-
8	60	20	19	1	-
9	40	20	39	1	-
10	100	-	-	-	-

Table C.7.--Other leasable minerals commodity of shares of total output by NFS Region

Region	Phosphate	Barite	Lead	Zinc	Copper
(Percent)					
1	100	-	-	-	-
2	-	-	-	-	-
3	100	-	-	-	-
4	100	-	-	-	-
5	100	-	-	-	-
6	100	-	-	-	-
8	60	40	-	-	-
9	-	-	80	10	10
10	100	-	-	-	-

Table C.8.--Compound annual growth rate for energy commodity prices, 1977-2030

	<u>1977-1995</u>	<u>1995-2030</u>
Oil	2.6	2.0
Gas	2.4	2.0
Coal	2.3	1.6
Geothermal	3.1	1.6
Uranium	3.1	1.6

For RPA evaluation purposes, the regional growth rates for NFS energy mineral program were derived as the weighted average of these growth rates and are shown in table C.9.

Table C.9.--Regional growth rates for NFS energy mineral programs, 1980-2025

Year	NFS Region								
	1	2	3	4	5	6	8	9	10
1980	100	100	100	100	100	100	100	100	100
1985	114	114	114	113	114	116	113	113	114
1995	147	147	147	143	147	159	146	145	148
2005	180	176	179	170	180	186	178	176	180
2015	220	213	219	201	219	218	217	214	221
2025	268	257	268	239	268	255	264	259	269

The BOM has also supplied the Forest Service with a conditional price forecast for the year 2000 for minerals in the other leasable minerals category. For RPA purposes, the middle value in the price range forecast by BOM was used. The forecast is based on the assumption that the year 2000 prices will be achieved by a constant annual compound rate of growth between 1978 and 2000. After the year 2000 prices are assumed to grow at half this rate (Table C.10).

Table C.10.--Index of real prices for leasable minerals, 1985-2025

Year	Regions 1-6 and 10	Region 8	Region 9
	(1978 = 100)		
1985	112	109	106
1995	136	130	118
2005	158	149	128
2015	176	162	136
2025	194	177	143

Water

The value of water is a function of its use. Forest lands, and particularly National Forests, are located at higher elevations which receive high levels of rainfall. Water produced from these lands may be used for several purposes as it flows through a basin, eventually accumulating a high total value.

For the 1980 Program, water output values were developed using the marginal value rather than total system value. These values were developed from a study by Young and Gray (1972) and a review of river basin models (Butcher et al., 1972; Hastay et al., 1971; Lundeen, 1977; Moncur, 1971).

In the West, the value of additional units of irrigation water was used as the benchmark in determining the marginal value of increasing water yields. This was done for several reasons:

1. Irrigation is by far the largest consumptive use of water in the West, where most of the National Forests are located (Table C.11).

2. Water for irrigation is the marginal water use. Since irrigation water values are among the lowest of all off stream uses, municipal and industrial users can often bid water away from agriculture users when faced with water shortages. In this manner, irrigation values tend to place an upper bound on the willingness of all water users to pay for additional water. How well this procedure works in practice, however, is dependent upon the local situation and the flexibility of State water rights.

3. The value of increased water yields from Forest Service programs can be computed as a residual value once the value of the marginal water use is known. The residual value is the value of the marginal water use less any incremental storage or distribution costs required to provide the water to users when and where they need it.

Table C.11.--Irrigation water consumption in the West
by water resource Region

(Percent)

Water resource region	Irrigation as a percent of total water consumption
Missouri	92
Arkansas - White - Red	87
Texas Gulf	83
Rio Grande	92
Upper Colorado	90
Lower Colorado	88
Great Basin	85
Columbia - North Pacific	93
California - South Pacific	91

Through time, the real value of water yield from Forest Service programs is likely to remain about constant. In the past, real water values have declined because excess capacity in agriculture and development of marginal lands for irrigation tended to depress agricultural profit margins and consequently the farmer's willingness to pay for irrigation water. However, for a number of reasons, the long-term decline in real water values is not expected to continue. Forces that might be expected to push water values up in line with general price levels in the economy in the future include:

1. Urbanization and development of energy resources will increase the proportion of water in municipal and industrial uses relative to lower valued irrigation uses.

2. The cropping mix is likely to shift to higher valued crops in some areas, increasing the marginal value of irrigation use.

3. Costs of developing alternative sources of water are likely to increase. Development of alternative sources is likely to involve transporting water greater distances. The costs of pumping both surface and ground water are likely to increase with rising energy costs.

Recreation, Wilderness, and Wildlife and Fish

At present, there is no comprehensive set of market prices or forecast of prices for outdoor recreation (i.e., recreation and wilderness) and wildlife. These elements have constituted a social good for which market values have been largely nonexistent. Therefore, outdoor recreation and wildlife "demand" are usually evaluated and projected through time in terms of expected participation, with prices and quantities supplied externally.

In the last several decades, however, the private sector has provided increasing quantities of outdoor recreation opportunities. Increasingly, sentiment in the public sector has been to leave the development of more capital-intensive, convenience-oriented facilities to the private sector. Recognition of the complementary nature of public and private supplies of outdoor recreation has contributed to the expansion of the private sector's role in meeting recreation demand. The principal outdoor recreation facilities now commonly provided through the private sector include marinas, campgrounds, and skiing facilities (both downhill and cross-country). Basic site fees at private campgrounds averaged \$4.60 in 1977, and the price of lift tickets for a day of downhill skiing ranged from \$8 to \$16.

The unit-day value approach was used to estimate Forest Service regional recreational, wilderness, and wildlife and fish program benefits. These values represent a "net" economic value to the consumer or user. That is, the cost necessarily incurred to use the resource is subtracted from the value to the user or consumer.

The values developed were based on available research data and unit values suggested by the Water Resources Council (Dyrland, 1973, Dwyer et al., 1977; Knetsch et al., 1977; Krutilla and Fisher, 1975). These values were adjusted for general price increases. In addition, the following points were considered in determining final values:

1. Available alternatives, access, facilities, recreation activities, aesthetics, and environmental quality.
2. Scarcity and possibilities of substitutes.
3. Cost of travel to a facility in money and time.

Based on available evidence, the relative prices for developed recreation will probably remain relatively constant in the coming decades. Although recreation expenditures have increased from approximately 3 percent of total personal expenditures in the 1920's to over 6 percent at the present time, Department of Commerce figures indicate that the recreational share of the consumer's expenditures has been relatively stable in the last decade (Table C.12). Also during the last decade, prices for recreation goods and services have remained relatively stable in real terms. For instance, between 1967 and 1977, prices for all services increased 94 percent while those for recreation services increased 62 percent.

This stability in recreation prices reflects the capability of producers to provide many recreation goods and services without experiencing significant supply constraints. For instance, there appear to be numerous areas suitable for campground development. This stability also reflects the ability of individuals to substitute recreation activities. For instance, it is possible to maintain normal levels of recreation participation at lower-than-normal price levels for most recreation activities. For example, a game of golf at a lavish overseas resort might cost as much as \$50, while a game at a typical small-town municipal course is just \$10. Thus, a golfer could maintain his traditional rate of participation during periods of economic difficulty simply by shifting to lower priced facilities. Similar price substitutions are available for almost all outdoor recreation activities. Another way to maintain traditional participation rates at a reduced cash outlay is to defer normal big-ticket purchases and/or expensive maintenance. Thus, such major durables as recreation vehicles and boats can be retained and used a year to two past the normal trade-in date.

For selected dispersed recreation and wildlife opportunities, however, it is anticipated that prices will increase in real terms because there appear to be few substitutes (Krutilla and Fisher, 1974). For instance, although an individual can take a nature hike or ride a horse in a developed city park, even the nonwilderness enthusiast will grant that such experiences are wholly different in character from backpacking or riding in a remote, undisturbed wilderness setting.

Therefore, it is assumed, based on professional judgment, that prices will increase faster than the general price level for dispersed recreation and wildlife activities. This increase will likely be consistent with projected "demands." The relative price increases anticipated for Forest Service outputs associated with dispersed recreation and wildlife and fish outputs are shown in Table C.13.

Table C.12.--Personal consumption expenditures and recreation

Year	Constant-dollar personal consumption expenditures (billions)	Constant-dollar recreation expenditures (billions)	Recreation as a percent of personal consumption expenditures (%)
1956	281.4	14.84	5.3
1957	288.2	15.30	5.3
1958	290.1	16.70	5.4
1959	307.3	16.90	5.5
1960	316.1	17.60	5.6
1968	452.7	28.90	6.3
1969	469.1	29.88	6.4
1970	477.0	31.44	6.6
1971	495.4	31.99	6.3
1972	524.6	34.82	6.6
1973	551.9	35.83	6.5
1974	545.7	37.11	6.8
1975	553.8	37.66	6.8
1976	616.7	41.31	6.7
1977	682.4	45.72	6.7

SOURCE: U.S. Department of Commerce

Table C.13.--Relative price increases anticipated for Forest Service outputs associated with dispersed recreation and wildlife and fish

	<u>1985</u>	<u>1995</u>	<u>2005</u>	<u>2015</u>	<u>2025</u>
	(1978 = 100)				
Alternative 1	100	100	105	113	125
Alternative 2	110	125	130	135	155
Alternative 3	100	100	114	123	140
Alternative 4	100	100	105	113	125
Alternative 5	100	105	119	133	150

Special mention must be made, however, of the relative price increases anticipated for Forest Service outputs associated with warm-water fishing and wilderness. Forest Service values for these resource outputs are likely to remain relatively stable in the next two decades. For warm-water fishing, the Nation's water pollution control programs are likely to increase opportunities sufficiently to dampen future price increases. Similarly, the selected RARE II areas should provide a significant increase in supply of designated wilderness. Therefore, it is anticipated that fishing and wilderness values will increase as shown for Alternative 3.

Returns to Government

Procedures used to estimate returns to government are shown in the following sections for timber, grazing, minerals, and recreation. Together these estimates represented the anticipated returns to the government for each Alternative and the Recommended Program.

Timber Receipts

Timber values as described in the timber value section were used directly. This was possible because these values were defined to reflect stumpage value. As such, they include not only cash payments for timber, but also required cooperative deposit (Knutson-Vandenberg), brush disposal, salvage fund, and cooperative road maintenance and purchaser credit for road construction. Since all of these deposits and credits represent payment in kind for services rendered to the government, they are a true part of the timber value.

When comparing projected timber receipts with actual receipts of recent years (1978 for example), one must remember that current year's receipts are based on sale contracts awarded several years earlier. Until recently, these contracts contained no inflation escalation clause. During periods of rapid price inflation, such as we have experienced in recent years, collections will lag behind current prices by 2-3 years. However, when prices fall the reverse is true, and over time this difference will tend to even out.

Purchaser credit for roads. 5/ --Sixty percent of the annual cost for new timber sales was used as an estimate of purchaser credit for roads. This was based on the relationship between the 1981 detailed activity listing and the 1981 analysis group totals. While the relationship varied slightly by program alternative (ranging from 59.2 percent to 63.4 percent), the precision of these projections did not justify using a separate ratio for each Alternative.

Knutson-Vandenberg (K-V) deposits. 6/ --We used 10 percent of the timber value each year, based on regression analysis for the period 1970-78. The best regression was

$$Y = 0.1007 X^{0.9994}, r^2 = 0.82$$

where Y is K-V deposits and X is timber value for year. This equation is very close to $Y = 0.10X$ and, for ease of calculation, the latter relationship was used.

Brush disposal deposits. 7/ --Based on the same kind of regression described for K-V deposits, brush disposal deposits were estimated as 4.5 percent of timber value.

Road maintenance deposits. 8/ --Required maintenance deposits were estimated as 1.5 percent of timber value, based on the average over 4 years for which we have data.

Grazing Receipts

The projected outputs (AUM) were multiplied by unit values to obtain an estimate of grazing fee collections. As previously explained, the unit value for fee is different from the value of the resource appropriate for economic analysis (Table C.14).

5/ 78 Stat. 1089, as amended; 16 U.S.C. 532 et. seq.

6/ 46 Stat. 527, as amended; 16 U.S.C. 576-576b.

7/ 39 Stat. 462, as amended; 16 U.S.C. 490.

8/ 78 Stat. 1090; 16 U.S.C. 537.

Table C.14.--Estimated grazing fee collection per animal unit month,
1981-2030

<u>Year</u>	<u>Fee value per AUM</u>
1981	\$2.35
1982	2.37
1983	2.28
1984	2.08
1985	1.76
1986-2030	2.00

These fee values were based on current fees and adjusted to reflect the formula contained in current legislation on grazing fees.

Recreation Receipts

Receipts for recreation use were estimated by multiplying projected developed recreation outputs (RVD's) by \$0.1763 per visitor-day. The unit value of a recreation visitor-day was calculated from 1978 data.

Mineral Receipts

Mineral royalty payments, as previously described in the mineral values section, were used with the following adjustments:

(1) The value of common variety material (rock, stone, etc.) used internally by the Forest Service was excluded.

(2) Mineral royalties from public domain lands were estimated separately by assuming that all royalties from Regions 1-6 and 10 were from public domain. These are collected and reported by BLM and are not part of the National Forest Fund. They are returned to the States at a 50-percent rate rather than 25-percent rate.

(3) Mineral royalties from acquired lands (assumed to be those from Regions 8 and 9) are included as part of the National Forest Fund.

Payments to States

Payments to the States from the National Forest Fund were calculated by taking 25 percent of the appropriate fund base. However, to estimate total return to States and counties that originate from National Forest System lands, one must add 50 percent of mineral royalties from public domain lands.

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APPENDIX D

FACILITIES OVERVIEW ANALYSIS

A number of support activities within this element will strongly affect accomplishment of projected demands. Discussion of the major impact activities follows.

National Forest Roads and Bridges

Demands for renewable natural resources such as forest products, minerals, forage, water and recreation areas are increasing, and they will continue to do so. Although most National Forest roads serve many needs, specific demands require transportation facilities to meet the requirements outlined below:

Timber

- Protection and salvage of timber susceptible to or damaged by fire, insects, and diseases.
- Intensive cultural treatment to increase growth, yield and quality.
- Reforestation of suitable timber-producing lands.
- Harvesting and movement of commercial timber.

Forage

- Distribution and management of livestock.
- Increase utilization of available forage.
- Rehabilitation of rangelands.

Land and Water

- Development, stabilization, and maintenance of water supplies.
- Restoration of disturbed and eroded lands.
- Orderly and safe use and occupancy of public and private lands.

Recreation and Wilderness

- Use of public and private recreation facilities.
- Scenic travel.
- Visiting wildernesses.
- Visiting other lands and waters.
- Environmental education.
- Preservation and awareness of historical and archeological treasures.

Minerals and Energy

- Exploration, development, extraction, and movement of minerals and energy fuels.

Wildlife and Fish

- Habitat improvement.
- Establishing, managing, and harvesting fish and wildlife.
- Viewing and photographing wildlife.

The existing Forest Service road system totals 249,000 miles of roads and related bridges. This total represents a capital investment needed to provide the access for complete resource management. The final total road system of 398,000 miles will consist of 20,000 miles of arterial roads, 78,000 miles of collector roads, and 300,000 miles of local roads.

Current programs are designed to provide various levels of maintenance for all roads depending on the traffic permitted or required by ongoing resource programs. Two types of maintenance funds are available: appropriated funds, and allowances in the timber appraisal. In 1978, these funds totaled \$123 million. This amount is estimated to be \$30 million less than that required for a suitable level of maintenance. This deficiency has resulted in premature road reconstruction (prior to end of design life) to provide adequate access for resource management. In 1978, road reconstruction consisted of 6,500 miles, representing 60 percent of the total Forest Roads and Trails construction-reconstruction program.

Inspection has indicated that of the 7,100 structures meeting bridge definitions, 1,876 require posting at less than State legal load limits and 178 require closure. Estimated cost of bringing the bridge structures to minimum acceptable standards is \$96 million. The problem is not solved by delay. Inflation of equipment, materials, and labor costs in the construction industry exceeds that for the economy as a whole. Thus, planners are faced with making major expenditures now or even larger expenditures later.

The effects of both road construction-reconstruction and maintenance on energy consumption must be evaluated in future programs of resource use and production. Alternatives will be sensitive to the energy factor.

Environmental concerns will remain at least at the high current level with road building still viewed as disruptive to the environment and subject to tradeoff analysis.

Potable Water and Wastewater Systems

The Forest Service has approximately 10,000 existing potable water and wastewater systems serving both recreation (80%) and administrative (20%) facilities.

The potable water systems (approximately 5,500) are subject to the regulations promulgated under the Safe Drinking Water Amendments of 1977 9/ and all State and local requirements. A few of the larger potable water systems identified as critical public health problems have been improved, but most water systems are substandard. Currently, there are about 200 water systems closed to public use because they are in an unsanitary condition and an additional 700 systems must be closed due to noncompliance with regulations unless necessary improvements are made. Total estimated cost to bring all water systems to a sanitary standard is \$80 million. The wastewater systems are subject to the regulations promulgated under the Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977 10/ and all State and local requirements. During the past several years, major sources of wastewater pollution have been corrected under the water pollution abatement program; however, there are approximately 2,500 minor sources of pollution that still require upgrading. Total estimated cost to complete this work is \$50 million.

The Forest Service currently has a total capital investment of \$150 million in potable water systems and \$150 million in wastewater systems. Annual expenditures of about \$12 million are required simply to maintain them.

Recent legislation requires Federal agencies to comply with all State and local requirements. The current impact has not been great, but these requirements will result in increased capital investment and operation and maintenance costs as States develop their primary regulations.

In the long term increasingly sophisticated treatment techniques will be required for both water and wastewater systems. Construction, operation, and maintenance costs will continue to increase at higher than normal inflation rates due to environmental and geographical limitations.

9/ 91 Stat. 1393; 42 U.S.C. 201 note.

10/ 91 Stat. 1566; 33 U.S.C. 1257.

Dams

The National Dam Inventory, developed in response to National Dam Safety Act, 11/ indicates there are approximately 50,000 dams in the United States with a height of 25' or greater, or a storage volume of 50 acre-feet or more. Of these, the Forest Service administers about 1,500; more than any other Federal agency. The Forest Service administers 13,000 smaller dams (between 6' and 25' high and 15 and 50 acre-feet in volume) on National Forest lands which require some degree of administration and maintenance. Funds are not allocated specifically for dam administration, periodic inspections, maintenance, or rehabilitation. A national overview indicates maintenance is less than adequate. During the last year, 33 dam failures were recorded on Forest Service lands. Two of the dams were listed in the National Inventory. The remaining structures were small impoundments for livestock. One minor dam failure resulted in damage to private property resulting in a damage claim which has not yet been settled.

In December 1977, the President directed Federal agencies to reevaluate all dams which are located such that failure would result in loss of life or significant property damage. The reevaluations are to be based on state-of-the-art criteria and are to be completed by 1981. It is estimated that the cost associated with correcting deficiencies identified for Forest Service administered dams will be about \$20 million.

Federal agencies will also be required to comply with "Federal Guidelines for Dam Safety" which have been developed as a result of the National Dam Safety Act. One significant requirement in the Guidelines is periodic inspection of all dams in the National Inventory. The program consists of (1) a maintenance inspection every 2 years, and (2) a complete safety inspection and reevaluation once every 5 years.

The projected annual recurring cost for inspection and maintenance of dams in accordance with these Guidelines is about \$3,000,000. In addition, about \$1,500,000 per year are required for repair and rehabilitation. The cost for rehabilitation work can be expected to escalate in about 15 to 20 years as more dams approach the end of their expected design life.

Nationally, probable costs are:

	<u>1981</u>	<u>1982-85</u>	<u>1986-2030</u>
Capital investments	5.5	5.5	1.5
Operation and maintenance	3	3	3

These costs are displayed by Region, and compared to the Regions' requested 1981 allocation for dams in Table D.1.

Costs for inspections and routine maintenance can be expected to increase at the general inflation rate. The heavy construction costs associated with repair and rehabilitation work, however, are projected to increase more rapidly due to potential shortages of energy, cement, and steel.

11/ 86 Stat. 506; 16 U.S.C. 791a.

Table D.1.--Recommended and estimated costs for dam inspection and maintenance

<u>Region</u>	1981	
	<u>Dam inspection and maintenance</u>	
	<u>RF</u> <u>recommended</u>	<u>WO</u> <u>estimated</u>
	(Millions of dollars)	
1	.04	.07
2	.33	1.65
3	.11	.61
4	.17	.85
5	0**	1.30
6	.10	.22
8	.20	1.00
9	.16	1.00
<u>10</u>	<u>.02</u>	<u>.02</u>
Total	*1.13	8.50

* An additional 0.13 is included in the Recreation element program.

** Included in benefiting Resource element.

Future energy shortages may stimulate conversion of existing dams for hydroelectric power production.

Continued environmental concerns will limit the number of large dams constructed in the future. These same concerns will undoubtedly result in increased efforts at efficient operation and maintenance of existing dams to preclude further environmental degradation.

Anticipated advances in relating seismic evaluation to design could result in high reconstruction costs for dams in high earthquake potential areas.

As the cost of maintaining dams increases, so will administrative costs for the Forest Service to manage permitted dams.

Motor Vehicles

The Forest Service owns 15,000 motor vehicles and 2,800 construction equipment units; holds long-term leases on 2,000 vehicles from General Services Administration and 7,000 vehicles from commercial sources; and rents privately owned vehicles for 20 million miles of use. In addition to this equipment, the Forest Service also owns a large number of construction, specialized and miscellaneous units that are obtained and supported by direct project expenditures. The annual expenditure necessary to support the total equipment program is approximately \$96 million.

Two-thirds of the equipment owned by the Forest Service is capitalized in the Working Capital Fund (WCF), which is a self-sustaining revolving fund supported by assessment of equipment use costs to provide for the management, operation, maintenance, and replacement of covered equipment. The remaining one-third is owned for specific projects and is not included in the WCF system. The total capital investment for all Forest Service-owned equipment is nearly \$150 million.

Inflation is a key factor in the equipment management program. The operation, maintenance, and replacement costs for most fleet equipment have increased more than 10 percent per year recently. As a result, resource programs whose budgets have increased at a lesser rate have suffered.

Energy consumption is another critical issue. Present direction is designed to achieve a 20 percent reduction in energy consumption by 1985. When considered with the increasingly restrictive fuel consumption and exhaust emissions regulations imposed on the automobile industry, the resulting consequences will undoubtedly require more efficient selection and utilization of motor vehicles.

Buildings and Related Facilities

The Forest Service owns and operates approximately 22,000 buildings and structures which support the activities of the National Forest System. These include offices, warehouses, residences, fire lookouts, shops, storage buildings, visitor information centers, and aircraft hangars. In terms of numbers, the Forest Service is one of the largest owner/operators of facilities in the government. Replacement value of these facilities is approximately \$1.2 billion. In addition, the Forest Service leases several hundred facilities directly or through GSA.

Many facilities are 30-50 years old, completely antiquated; they should be replaced. Others, while structurally sound, are functionally obsolete. Operational efficiencies are seriously compromised due to mission and work pattern changes and/or overcrowded conditions. Considering an average 40-year life, a replacement construction program would require an estimated \$40 million to \$50 million per year. This is in addition to new construction needs, which are approximately \$5 million per year.

Maintenance of the facilities has also been lagging. The combined effects of increased maintenance requirements as facilities become older, plus deferred maintenance and increasing costs have caused a considerable maintenance deficiency which is estimated to exceed \$100 million. In addition, normal annual maintenance is estimated at \$40 million (Tables D.2 and D.3).

Recent legislation has dramatically affected the facilities program. While much progress has been made, an additional \$25 million will be required to obtain compliance with the Occupational Safety and Health Act, 12/ provisions for Handicapped Accessibility, and Equal Employment Opportunity.

12/ 92 Stat. 183; 29 U.S.C. 661.

Table D.2.--Building maintenance and construction cost estimates

	<u>1981</u>	<u>1982-85</u>	<u>1986-90</u>	<u>1991-2030</u>
	(Millions of dollars)			
<u>Building Maintenance</u>				
Routine	40	40	40	40
Backlog	15	15	0	0
<u>Building Construction</u>				
Replacement	40	41	50	50
New Construction	4	5	5	5
Energy Conservation	10	10	10	0
Handicap Accessibility	2	2	0	0
Equal Employment Opportunity	1	1	0	0
Safety and Health	3	3	0	0

Table D.3.--Building maintenance and construction cost estimates for 1981 by Region

	<u>Building maintenance</u>		<u>Building construction</u>	
<u>Region</u>	<u>RF</u> <u>recommended</u>	<u>WO</u> <u>estimated</u>	<u>RF</u> <u>recommended</u>	<u>WO</u> <u>estimated</u>
	(Millions of dollars)			
1	1.9	4.8	3.6	5.2
2	.9	3.9	2.8	4.3
3	1.7	2.6	1.5	3.1
4	2.2	7.3	4.6	6.3
5	3.1	11.2	3.9	12.2
6	3.9	13.9	4.2	15.3
8	3.7	5.5	2.4	6.1
9	0.8	3.8	1.8	4.1
<u>10</u>	<u>1.9</u>	<u>2.0</u>	<u>4.1</u>	<u>3.4</u>
Total	20.1	55.0	28.9	60.0

Recent passage of the National Energy Conservation Policy Act 13/ requires all Federal buildings over 1,000 square feet to be modified by 1990, when cost effective, to conserve energy. This program will require an estimated \$60 million to retrofit existing structures during the decade.

In the future much more emphasis may be placed on economy in providing services to the public in an efficient, cost-effective manner.

Energy availability will become a key factor in management of the land. Another factor will be the increased public demands for prudent and intensive land management. These factors will require personnel to be located closer to the field level. Additional, larger, and more complex facilities will be required at decentralized locations. While the number of offices or administrative units may not increase, they will require larger and more complex facilities.

If human resource development programs continue or increase, support facilities responding to these programs will also be needed.

As landownership and management patterns stabilize, leasing will become less favorable. Longer tenures will tend to make government construction more economical than leasing.

13/ 92 Stat. 3206.

APPENDIX E

1980 RPA GLOSSARY

Activity.--A work process or a group of work processes that make up a specific kind of task which, when implemented, will result in specific outputs or effects. An activity can generate multiple outputs.

Accomplishment.--The statistical measure that indicates the amount of Agency output or activity achievement.

Administration and operation.--The personnel and dollars needed to administer (including all General Administration expenses) resource element programs and to operate all the activities and actions needed to provide system outputs. This category includes those activities typically associated with the routine provision of system outputs (goods and/or services) as executed by system managers.

Analysis.--The comparison of resource management alternatives in terms of inputs, outputs, effects, and costs. In developing the Renewable Resources Program, this process included assessing the resource situation, establishing goals, constructing a data base, developing alternatives and comparing them in light of potential consequences.

Annual budget.--The annual funding estimate developed for expenditures for a fiscal year for submission successively to the USDA, OMB, and Congress. The amounts actually appropriated for a fiscal year become that year's appropriation.

Appropriation.--An authorization by an act of Congress that permits Federal agencies to incur obligations and to make payments out of the U.S. Treasury for specified purposes.

Assessment.--See Renewable Resources Assessment.

Attainment reporting.--The collection of quantitative information on outputs produced, the cost of producing them to meet identified objectives, and the presentation of the information in a manner which facilitates its use in evaluating the efficiency and/or effectiveness of the producer.

Authorization (authorizing legislation).--Basic substantive legislation enacted by Congress which sets up or continues the legal operation of a Federal program or agency either indefinitely or for a specific period of time or sanctions a particular type of obligation or expenditure within a program.

Backlog.--The quantity and quality of outputs needed to restore a renewable resource and its associated facilities to a level of productivity or condition consistent with the three qualifying criteria as required by statutory and Executive direction. This term applies principally to the National Forest

System section of the Renewable Resources Program, but research required to restore these resources is considered as part of the backlog.

Benefits.--Ideally, estimates of all benefits, outputs, or effectiveness expected to be received or achieved as a result of undertaking a proposed activity, program, or project. Realistically, a particular commodity under a given activity has specific beneficial outputs, although some attendant outputs may be negative or nonbeneficial.

Budget.--This is a comprehensive term used to designate any report or summary of estimated financial requirements, or of the planned use of funds for government operations for a specified period of time.

Budget authority.--Authority provided by law to enter into obligations which generally result in immediate or future outlays of government funds.

Budget year.--The fiscal year for which the budget is being considered; that is, the fiscal year following the current year.

Capital investment.--Cash outlays allocated to increase the stock of natural and man-made resources (assets) needed to maintain or increase the flow of outputs in the future. Benefits resulting from the outlays are recouped over a period in excess of 1 year. These stocks are further defined as:

- Natural resource assets that are expected to produce a primary output in the future. An example is timber stand improvements which result in increased availability of timber outputs.
- Man-made assets (particularly permanent structures) that are required to produce a primary output. Examples are roads, campground facilities, Ranger Stations, research laboratories, and fire lookout towers.
- Knowledge needed to produce primary outputs. Examples are timber management or genetic research, forest product utilization research, and development.

Capital v. operational nature (of needs and opportunities).--Activities defined as being of a permanent (capital) nature or of a maintenance or annual (operational) nature. "Capital" nature examples include recreation facility construction, road construction, and timber stand improvement. "Operational" nature examples include recreation area and road maintenance, and timber compartment examination and prescription.

Constraint.--A limiting or satisfying condition which must be met when setting objectives. "Ceiling" or "floor" may be used in the same manner.

Cooperative Forest Service programs.--Operating programs designed to accomplish goals for non-Federal public and private forest and range land. They are administered by the Forest Service in cooperation with State forestry agencies.

Cost effectiveness.--A comparison of alternative system programs or multi-resource programs. A cost effectiveness analysis compares Alternatives in terms of their contribution to a goal using costs and other effectiveness criteria.

Criteria.--See decision criteria.

Current year.--The fiscal year in progress.

Decision criteria.--Decision criteria are essentially rules or standards used to rank Alternatives in order of desirability. Stated directly, they are measurements or indicators that are designed to assist a decisionmaker to identify a preferred choice from an array of possible Alternatives. In the case of RPA, they indicate how well a prescribed course of action in a resource element or a multiresource program meets a set of goals, objectives, and targets in comparison to other element and program Alternatives.

Decision group (unit).--Decision groups are aggregations of primary activities that are usually done together to produce an output, or they may be common or interdependent activities necessary for meeting or reaching a goal or objective. They are generally amenable to analysis and interpretation in terms of outputs, effects, benefits and costs. This analysis is used to support the decisionmaking process which looks at options to determine how well goals and objectives can best be met.

Direct v. indirect financial returns.--Monetary benefits derived from Forest Service activities. Direct returns yield monetary returns directly to the U.S. Treasury. Indirect returns provide additional taxes to the U.S. Treasury from activities induced by the program. Examples are timber sale receipts (direct) or recreation vehicle travel expenditures (indirect).

Disbursements.--Gross disbursements represent the amount of checks issued, cash, or other payments made, less refunds received. Net disbursements represent gross disbursements less income collected and credited to the appropriation or fund account, such as amounts received for goods and services provided.

Discounting.--An adjustment for the time value of money. It is a mathematical process of reducing costs and/or benefits (flows) that will occur in future years to a common time, usually the present, so that they can be compared.

Discount rate.--See interest.

Economic analyses.--Economic analyses of the effectiveness of various proposed resource management alternatives or combinations of alternatives involves the estimation of costs, output volumes, and values for the outputs that are expected to occur. That is, we must look at timespans (time horizons or timestreams) of year-by-year sequences of resource outputs. These outputs may also vary each year in an expected pattern of flow. In order to make the various alternatives directly comparable to each other, the monetary values used are discounted to a common time.

Economic life--service life.--The period of time extending from date of installation to date of retirement from the intended service.

Element.--See program element.

Environmental analysis.--A determination of the probable effect of the Renewable Resources Program upon the renewable resources, considering the interaction of physical, natural, social, and economic factors. This analysis is made in accordance with Section 102 (2) (c) of NEPA (P.L. 91-190).

Equilibrium price.--The price at which the quantity of goods or services offered is equal to the goods or services purchased.

Expenditures.--A term used interchangeably with outlays.

Feasible program proposal.--A proposal that falls within the bounds of the agency's authority, resource capability, other controlling factors, and can be accomplished during the next 10 years. Authority deals with all legal requirements such as the Multiple Use-Sustained Yield Act, Executive orders, cooperative agreements, and regulations. Controlling factors encompass demands for goods and services, resource capabilities, environmental impacts, budget and personnel limitations, and technology.

Forest land (woodland).--Land with at least a 25-percent tree canopy cover or land at least 10 percent stocked by forest trees of any size including land formerly having had such tree cover and that will be naturally or artificially reforested. Minimum requirement is 1 acre and at least 100 feet wide.

Forest range or grazable woodland.--Forest land which naturally or through silvicultural actions will support, at one or more stages in secondary succession, an herbaceous or shrubby understory that provides forage suitable for grazing or browsing animals.

Fund category.--A group of funds (programs with a similar accounting constraint; appropriated, allocated, permanent and/or trust) used to specify budget levels in the program budget process.

Funding level.--The financial constraints on developing a section of a program proposal for a given period. More than one funding level may be established with the lower level, level 1, usually being less than the base year and the upper level usually being greater than the base year.

General fund.--The fund credited with all receipts not earmarked by law for specific purpose and from general borrowing. It is used for the general purposes of the Government through various general fund accounts.

Goal.--A concise statement of the Department's central strategy in addressing the national problems represented by the USDA missions, expressed in terms of a desired state or process that operating programs are designed to achieve. A goal is normally expressed as a broad, general statement; is usually not quantifiable; and is timeless in that it usually has no specific date by which it is to be completed. Often, it would not be expected that a goal could ever be completely achieved. The goal is the principal statement from which objectives must be developed.

Guideline.--This is any issuance which assists in determining the course of direction to be taken in any planned action to accomplish a specific objective.

Inputs.--The basic resources of land, labor, and capital required to carry out an activity.

Interest.--The cost or time value of money.

Internal rate of return.--The rate of interest at which future project costs and benefits discounted to the present are equal.

Investment costs.--See capital investment.

Land management planning.--The process of organizing the development and use of lands and their resources that will best meet the needs of people while maintaining maximum flexibility for a dynamic combination of resource outputs for the future.

Least cost.--The minimum cost that must be accrued to meet specified goals and objectives.

Line item.--Any portion of an appropriation that is identified specifically in the budget sent to the Congress by the Forest Service.

Maintenance.--The personnel and dollars required to ensure the continued safe operation and/or utility of system capital facilities.

Management-by-objective.--A management process whereby managers at various levels in an organization jointly define the organization's goals, define each individual's major responsibilities in terms of measurable results, and use these measures as guides for operating the organization and assessing unit or individual contributions to meeting the identified goals.

Management information.--Data that are neither classified as an output nor activity but are included in various reports to monitor progress; e.g., motor vehicle accident frequency used in a program status and attainment report.

Management review system.--This system is designed to evaluate the application of regulatory measures, the compliance of Forest Service units with agency policies and procedures, and the effectiveness of cooperative efforts among various units within the Forest Service. The two general classes of management reviews are (1) General Management Reviews and, (2) System, Program, and Activity Reviews.

Marginal cost.--The addition to total cost caused by producing one or more unit of output.

Mission.--A major continuing national problem or concern that programs are designed to address. Missions represent the basic reasons for the existence of an organization in the Federal Government and characterize the Department's role in solving broad national problems.

National direction.--The policy statement of mission, goals, and broad-based objectives that guides all of the agency's efforts.

National Forest System.--Units of federally owned forest, range, and related lands throughout the United States and its territories united into a nationally significant system dedicated to the long term benefit of present and future generations.

Net direct benefits (primary benefits).--The value of the change in production of outputs that accrues to the direct use of the project. They are increases or gains in the value of goods and services that result from conditions with the program or project as compared to conditions without the program or project.

Net present worth.--The present value of future benefits less future costs discounted at a stated discount rate.

Objective or target.--A clear and specific statement of planned results to be achieved within a stated time period. The results indicated in the statement of objectives are those which are designed to achieve the desired state or process represented by the goal. An objective is measurable and implies precise time-phased steps to be taken and resources to be used which together represent the basis for defining and controlling the work to be done.

Obligations.--Amounts of orders placed, contracts awarded, services rendered, or other commitments made by Federal agencies during a given period which will require outlays during the same or some future period.

Operating program.--A collection of related activities under unified technical or scientific leadership. It includes Forest Service resource management and support programs and responsibilities in research, cooperative programs, and the National Forest System.

Operation and maintenance.--The personnel and dollars needed to operate the programs, administer the activities involved, and maintain the capital improvements of the element. This is further categorized into the following four groups: (1) administration and operation, (2) inventory, analysis and plans, (3) maintenance, and (4) support.

Opportunities.--Those activities that are considered in developing the Renewable Resources Program where an option exists to invest inputs profitably to improve or maintain the renewable resources of the National Forest System and non-Federal and private forest and range land. Opportunities include research activities.

Opportunity cost.--The value of benefits that could produce the best alternative use of resources foregone or given up because of choosing another management alternative.

Outlays.--Checks issued, interest accrued on the public debt or other payments, net amount of refunds and reimbursements.

Outputs.--Goods, services, products, and concerns produced by activities which are measurable and capable of being used to determine the effectiveness of programs and activities in meeting objectives. The unit of measure should indicate or serve as a proxy for what the recipients get rather than what the agency does in the process of producing the given output. Example: timber sold, recreation use, livestock grazing use, etc.

Output and effect measurement units.--Standardized yardsticks or measurement units that are direct or indirect measurements of the amount or rate of an output or its effect. Example: recreation visitor days/year, acre-feet/year, million cubic feet/year.

Permanent funds.--Funds generated by Forest Service activities under legislative authority but which are not appropriated by Congress (e.g., brush disposal, license program).

Personnel.--People employed by the Forest Service whose salary is paid from appropriated, allocated, or trust funds. (Does not include contractor, cooperator, volunteer, or work-force trainee personnel.)

Policy.--A definite course or method of action selected by a governmental agency, institution, group, or individual from among alternatives and future decisions.

Policy options.--Discrete guides or limits to the same action or decision, each of which would produce different results. Development of the Renewable Resources Assessment and Program requires the examination of policy options.

Present worth.--The series of benefits or costs that occur with a program or project over time discounted back to present time. It could be described as that amount of money one would have to deposit now, at a given rate, to accumulate to a known future value for either benefits or costs.

President's budget.--The budget for a particular fiscal year transmitted to the Congress by the President in accordance with the Budget and Accounting Act of 1921, as amended.

Primary output.--The main goods, services, or environmental conditions of a resource element--the key indicators used to identify objective attainment. For example, the production of animal-unit-months of forage for livestock or board feet of timber harvested.

Program.--Sets of activities that contribute to mission goals. Each program has a specific objective, is defined in terms of expected results, and is located in one agency with a manager for resources allocated and responsible for achievement of results.

Program budget.--The document containing explanations, justifications, and quantitative input and output projections and personnel requirements for all program proposals.

Program element.--A Forest Service endeavor necessary to fulfill statutory or Executive requirements. There are two types of program elements: resource and support. (See definition for each.)

Program planning.--A process of identifying objectives, establishing relationships among resource program objectives, evaluating alternative courses of action for objective attainments, establishing output targets, and projecting costs and personnel requirements, based on negotiation and interaction with organizational units concerned.

Project.--An action or series of actions identified with a single objective grouped together for managerial convenience. A project may or may not constitute a complete activity.

Proposals.--The development of initial objectives which contribute to achieving Forest Service goals and of activities to accomplish these objectives.

Public involvement.--A Forest Service effort to inform the public of factors that relate to land and resource management and to elicit their comments and points of view before and during decisionmaking.

Purchaser credit.--Credit earned by a purchaser's construction of specified roads or as otherwise provided under provisions in the timber sale contract.

Purchaser credit limit.--The maximum amount of purchaser credit that will be recognized. It will never exceed the listed total estimated cost of project segments.

Rangeland.--Land on which the potential natural vegetation (climax) is predominately grasses, grass-like plants, forbs, or shrubs. It includes land revegetated naturally or artificially that is managed like native vegetation. Rangelands include natural grasslands, savannahs, shrublands, most deserts, tundra, alpine communities, coastal marshes, and wet meadows. It includes land with less than 25 percent tree canopy or less than 10 percent stocking with forest trees of any size.

Receipts.--Moneys received by the Federal Government from the public.

Reimbursements.--Sums received by the Government for commodities sold or services furnished that are authorized by law to be credited directly to specific appropriation and fund accounts.

Renewable resources.--Those resources where it is possible to maintain use indefinitely, because the use rate does not exceed the ability to renew the supply. However, in the Renewable Resources Program, the term is used to describe those matters within the scope of responsibilities and authorities of the Forest Service as required by the act. Consequently, the resources treated include: (1) timber, (2) range, (3) wildlife, (4) fish, (5) water, (6) recreation (7) wilderness, and (8) land.

Renewable Resources Assessment.--An appraisal of the Nation's renewable resources that recognizes their vital importance and the necessity for long-term planning and associated program development. The Assessment meets the requirements of Section 3 of the Resources Planning Act and includes analyses of present and anticipated uses, demands, and supplies of the renewable resources; an inventory of present and potential renewable resources; a description of Forest Service programs and responsibilities; and a discussion of policy considerations, laws, and regulations.

Renewable Resources Program.--Plans of action designed to accomplish a set of goals and defined in terms of the principal actions required to achieve those goals, together with outputs, results anticipated, and personnel requirements. The Program provides a basis for budget and meets the requirements of Section 4 of the Resources Planning Act.

Resource allocation.--The distribution of available input resources to various activities in such a way that total effectiveness will be increased or maintained if optimal. Allocation is necessary when there are limitations on either the amount of resources available or on the way on which these can be expended.

Resource element.--A major Forest Service endeavor which fulfills statutory or Executive requirements and indicates a collection of activities from the various operating programs required to accomplish a mission. There are eight Resource Elements:

(1) Recreation.--This describes the resources which provide outdoor recreational opportunities for the Nation. Included are provision or development of new knowledge on the resources, and technical assistance.

(2) Wilderness.--This describes the Nation's wilderness resource. This element includes lands designated for preservation and protection in the natural condition for the National Wilderness Preservation System.

(3) Wildlife and fish.--This describe the resources which are directed to protection and improvement of wildlife and fish. Coordination with State agencies is a key element. Included are the provision of technical assistance and the development of new knowledge.

(4) Range.--This describes the activities that involve the resources that manage, protect, and develop forest and range lands for grazing. The element encompasses activities on both National Forest and private forest range lands, and the research needed to effectively consider management alternatives.

(5) Timber.--This describes the resources needed to grow wood and to make it available to the Nation on a continuing basis and comprises activities needed to protect, manage, harvest and utilize wood and wood-related products.

(6) Water.--This describes the administration and enhancement of water resources in a manner consistent with other resource values. This element includes watershed and river basin planning and development in cooperation with States and other agencies, and research designed to further knowledge about the water resource.

(7) Minerals.--This describes the administration of exploration and development of minerals in a manner consistent with other resource values on National Forest lands. This element also includes research and cooperative activities to enhance reclamation of mined lands.

(8) Human and community development.--This describes the responses needed to help people and communities to help themselves. The element includes activities that are directed to individuals in programs such as the Job Corps and the Youth Conservation Corps, and those directed toward improving the economy and the quality of the environment in rural areas and communities such as the Urban and Community Forestry Program.

Roads, arterial.--Roads and trails comprising the basic access network for NFS administrative and management activities. These roads and trails serve all resource elements to a substantial extent, and maintenance is not normally determined by the activities of any one element. They provide service to large land areas and usually connect with public highways or other National Forest arterial roads to form an integrated network of primary travel routes. Locations and standards are determined often by a demand for maximum mobility and travel efficiency rather than by a specific resource management service. Usually, they are developed and operated for long-term land and resource management purposes and constant service.

Roads, collector.--Roads and trails constructed to serve the activities of two or more elements but which do not fit into the other two categories (arterial or service). Construction costs of these facilities are prorated to the respective element served. These roads serve smaller land areas and are usually connected to a National Forest arterial or public highway. They collect

traffic from National Forest local roads or terminal facilities. Locations and standards are influenced by both long-term multiresource service needs and travel efficiency. Collector roads may be operated for either constant or intermittent service, depending on land use and resource management objectives for the area served by the facility.

Roads, local.--Roads and trails constructed and maintained for the activities of a given resource element. Some use may be made by other element activities, but normally maintenance is not affected by such use. These roads connect terminal facilities with National Forest collector or arterial roads or public highways. Locations and standards usually are determined by the requirements of a specific resource activity rather than by travel efficiency. National Forest local roads may be developed and operated for either long- or short-term service.

RPA annual evaluation report.--This is an annual evaluation report that measures Forest Service progress and accomplishments in its long-term program and discusses changes in its assessment of the inventory of forests and range lands. It contains a quantitative assessment of Forest Service performance in all program elements on a national basis.

Special funds.--Federal funds credited with receipts that are earmarked by law for a specific purpose.

Standard.--A statement which describes a condition when a job is done properly. Standards show how well something should be done rather than what should be done.

Stewardship.--Level of funding for maintenance, protection, and administrative activities that are necessary to maintain resources in their existing (or agreed upon) ability to produce benefits, but excluding those maintenance and administrative needs that are generated by controllable usage. Specifically excluded are the variable costs of production that are a function of marketed or otherwise controlled output levels, and all investments to improve productivity or usability for the future.

Statement of Policy.--A Presidential document detailing the President's middle range (5 to 10 years) budget requirements to accompany the Renewable Resources Assessment and Program showing how the Executive branch plans carry out the provisions of the Assessment and Program. It is used to develop the budget requests necessary to fund the multiyear Program.

Support element.--A major Forest Service endeavor which sustains the resource elements. There are four Support Elements:

(1) Protection.--This provides for those activities which protect and maintain basic values, and prevent and reduce damages and losses to multiple resource element outputs on forest and range lands. It includes insect and disease control, fire protection, law enforcement, and development of new knowledge, and the technical assistance needed for both National Forest and private forest and range lands. Protection activities which primarily benefit a single resource element are not included within the Protection Element.

(2) Lands.--This provides for those activities such as land management planning, special land use administration, landownership adjustment, multi-resource inventories and special multiresource studies; and the development of new knowledge which primarily benefits multiple resource elements outputs.

(3) Soils.--This provides for activities which primarily protect, conserve, and enhance the basic soil productivity of forest and range lands which benefit multiple resource element outputs. It includes the development of new knowledge, surveys, protection, rehabilitation, and improvement activities directed toward both public and private lands through cooperative and technical assistance efforts and is in accord with specific SCS cooperative agreements. Soils activities which primarily benefit a single resource element output are considered a part of the benefiting element and are not included within the Soils Element.

(4) Facilities.--This provides for those activities which provide and maintain capital improvements such as buildings, roads, trails, fences, bridges, dams, and airfields that primarily facilitate multiple resource element output production. It includes the development of new knowledge and its application through cooperative and technical assistance efforts. Those facility activities that can clearly be identified as primarily supporting a single resource element output are considered a part of the benefiting element and are not considered in the Facility Element.

Trade-offs.--The total estimated amount of resource program outputs (market and nonmarket) foregone by (1) modifying and existing program or substituting one resource program for another, or (2) to switching among alternative courses of action. The economic value of this trade-off represents the Opportunity Cost.

Trust funds.--Funds collected and used by the Federal Government for carrying out specific purposes and programs according to terms of a trust agreement or statute. Trust funds are administered by the Government in a fiduciary capacity and are not available for the general purposes of the Government, e.g., K-V funds.

Unit values.--Values of economic, social, environmental outputs and "effects" that exist at the production or use-site and can be measured in dollars. Note: alternate terms--output values, response values.

User costs.--Values that users of goods or outputs pay to gain access to or to use a good or service. Such costs include transportation costs, concession fees, and similar payments to other than the resource owner.

Willingness-to-pay value.--The value that represents the amount a user of a good or service would be willing to pay rather than to go without it. Indications of willingness to pay may be obtained by direct questionnaires or indirectly by studies of payments for similar items in similar circumstances, or of related costs, such as transportation paid to get to point of use.

Work unit.--This is the smallest organizational unit that research recognizes within the management process.

Zero-base budgeting.--A management process that provides for systematic consideration of all programs and activities in conjunction with the formulation of budget requests and program planning.

